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APR 13 2001

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UNITED STATES PATENT AND TRADEMARK OFFICE

Christie, Parker & Hale LLP

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
09/772,100	01/26/2001	Prem S. Singh	SECKR-045059

CONFIRMATION NO. 7975

FORMALITIES LETTER



OC000000005920639

Pretty & Schroeder, P.C.
19th Floor
444 S. Flower Street
Los Angeles, CA 90071

CASE # 42892 ACTION MISSING PARTS
REMINDER _____ DUE DATE 5-30-01
DEADLINE 9-30-01

Date Mailed: 03/30/2001

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given TWO MONTHS from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 710 to complete the basic filing fee and/or file a small entity statement claiming such status (37 CFR 1.27).
- Total additional claim fee(s) for this application is \$180.
 - \$180 for 10 total claims over 20.
- The oath or declaration is unsigned.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.
- The balance due by applicant is \$ 1020.

*A copy of this notice **MUST** be returned with the reply.*

Customer Service Center

Initial Patent Examination Division (703) 308-1202

PART 1 - ATTORNEY/APPLICANT COPY

CONFIDENTIAL

CRPF07722

PTO-003513

RECEIVED

OCT 12 2001

Christie, Parker & Hale, LLP
OCTOBER 05, 2001

CHRISTIE, PARKER & HALE, LLP
KATHLEEN M. OLSTER
P.O. BOX 7068
PASADENA, CA 91109-7068



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

PTAS



101802439A

CASE # 42892 ACTION /
REMINDER DUE DATE
DEADLINE

UNITED STATES PATENT AND TRADEMARK OFFICE
NOTICE OF RECORDATION OF ASSIGNMENT DOCUMENT

THE ENCLOSED DOCUMENT HAS BEEN RECORDED BY THE ASSIGNMENT DIVISION OF THE U.S. PATENT AND TRADEMARK OFFICE. A COMPLETE MICROFILM COPY IS AVAILABLE AT THE ASSIGNMENT SEARCH ROOM ON THE REEL AND FRAME NUMBER REFERENCED BELOW.

PLEASE REVIEW ALL INFORMATION CONTAINED ON THIS NOTICE. THE INFORMATION CONTAINED ON THIS RECORDATION NOTICE REFLECTS THE DATA PRESENT IN THE PATENT AND TRADEMARK ASSIGNMENT SYSTEM. IF YOU SHOULD FIND ANY ERRORS OR HAVE QUESTIONS CONCERNING THIS NOTICE, YOU MAY CONTACT THE EMPLOYEE WHOSE NAME APPEARS ON THIS NOTICE AT 703-308-9723. PLEASE SEND REQUEST FOR CORRECTION TO: U.S. PATENT AND TRADEMARK OFFICE, ASSIGNMENT DIVISION, BOX ASSIGNMENTS, CG-4, 1213 JEFFERSON DAVIS HWY, SUITE 320, WASHINGTON, D.C. 20231.

RECORDATION DATE: 07/30/2001

REEL/FRAAME: 012037/0070
NUMBER OF PAGES: 3

BRIEF: ASSIGNMENT OF ASSIGNOR'S INTEREST (SEE DOCUMENT FOR DETAILS).

ASSIGNOR:

SINGH, PREM S.

DOC DATE: 07/27/2001

ASSIGNEE:

SWIFT-ECKRICH, INC.
2001 BUTTERFIELD ROAD
DOWNERS GROVE, ILLINOIS 60515-1049

SERIAL NUMBER: 09772100
PATENT NUMBER:

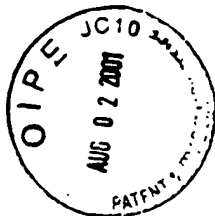
FILING DATE: 01/26/2001
ISSUE DATE:

ANTIONE ROYALL, EXAMINER
ASSIGNMENT DIVISION
OFFICE OF PUBLIC RECORDS

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CRPF07723

PTO-003514

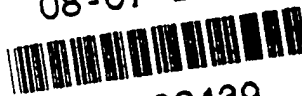


RECO.

08-07-2001

Docket No. 42892/KMO/C945

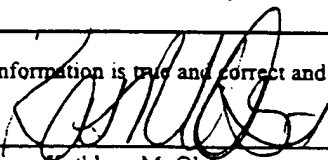
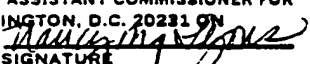
Box Assignment
Commissioner of Patents and Trademarks
Washington, D.C. 20231



101802439

Post Office Box 7068
Pasadena, CA 91109-7068

Commissioner of Patents and Trademarks: Please record the attached original documents or copy thereof:

<p>1. Name of conveying party(ies): 8201 Prem S. Singh</p> <p>Additional name(s) of conveying party(ies) attached: No</p>		<p>2. Name and address of receiving party(ies): Name: Swift-Eckrich, Inc. Street Address: 2001 Butterfield Road Downers Grove, Illinois 60515-1049</p>			
<p>3. Name of conveyance: <input checked="" type="checkbox"/> Assignment <input type="checkbox"/> Merger <input type="checkbox"/> Security Agreement <input type="checkbox"/> Change of Name <input type="checkbox"/> Other: Execution Date: July 27, 2001</p>		<p>Additional name(s) & address(es) attached? No</p>			
<p>4. Application number(s) or patent number(s): If this document is being filed together with a new application, the execution date of the application is: .</p> <table border="1"> <tr> <td>A. Patent Application No.(s) 09/772,100</td> <td>B. Patent No.(s)</td> </tr> </table> <p>Additional numbers attached? No</p>				A. Patent Application No.(s) 09/772,100	B. Patent No.(s)
A. Patent Application No.(s) 09/772,100	B. Patent No.(s)				
<p>5. Please return the recorded document and address all correspondence to: CHRISTIE, PARKER & HALE, LLP P.O. Box 7068 Pasadena, CA 91109-7068 Attention: Kathleen M. Olster</p>		<p>6. Total number of applications and patents involved..... 1</p>			
<p>10. <input type="checkbox"/> Explanatory letter is enclosed.</p>		<p>7. <input checked="" type="checkbox"/> Total fee enclosed (37 CFR 3.41): \$ 40.00 8. <input checked="" type="checkbox"/> Any deficiency or overpayment of fees should be charged or credited to Deposit Account No. 03-1728, except for payment of issue fees required under 37 CFR § 1.18. Please show our docket number with any credit or charge to our Deposit Account.</p>			
<p>9. Statement and signature. To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document. Date: July 30, 2001 By  Name: Kathleen M. Olster 626/795-9900</p> <p>I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE U.S. POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO: ASSISTANT COMMISSIONER FOR PATENT, WASHINGTON, D.C. 20231 ON <u>7/30/01</u>  DATE SIGNATURE</p>					
<p>08/07/2001 8TUM11 00000027 09772100 01 FC:581 40.00 CP</p>		<p>Total number of pages including cover sheet, attachments, and document: 3</p>			

KMO/nml

NML PAS368957 1--7/30/01 10 35 AM

CONFIDENTIAL

CRPF07724

PTO-003515

ASSIGNMENT

WHEREAS, Prem S. Singh, of 148 Spring Avenue, Glenellyn, Illinois, 60137, Assignor, has invented a new and useful **HIGH TEMPERATURE METHOD FOR BROWNING PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS** for which an application for United States Letters Patent was filed on January 26, 2001, Application No. 09/772,100, and

WHEREAS, Assignor believes himself to be the original, first and sole inventor of the invention disclosed and claimed in the application for Letters Patent; and

WHEREAS, Swift-Eckrich, Inc., an Illinois corporation, having a place of business at 2001 Butterfield Road, Downers Grove, Illinois, 60515-1049, Assignee, desires to acquire by formal, recordable assignment the entire right, title and interest in and to the invention, the application, and any Letters Patent that might be granted for the invention in the United States and throughout the world;

NOW, THEREFORE, in consideration of the sum of Ten Dollars (\$10.00) and of other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby sells, assigns and transfers to Assignee, the entire right, title and interest in and to the invention, the application, and any Letters Patent that might be granted for the invention in the United States and throughout the world, including the right to file foreign applications directly in the name of Assignee and to claim for any such foreign applications any priority rights to which such applications are entitled under international conventions, treaties or otherwise.

Further, Assignor agrees that, upon request and without further compensation, but at no expense to Assignor, he and his legal representatives and assigns will perform all lawful acts, including the execution of papers and the giving of testimony, that might be necessary or desirable for obtaining, sustaining, reissuing or enforcing Letters Patent in the United States and throughout the world for the invention, and for perfecting, recording or maintaining the title of Assignee, its successors and assigns, to the invention, the application, and any Letters Patent granted for the invention in the United States and throughout the world.

Assignor represents and warrants that he has not granted and will not grant to others any rights inconsistent with the rights granted by this Assignment.

CONFIDENTIAL

CRPF07725

PTO-003516

Assignor authorizes and requests the Commissioner of Patents and Trademarks of the United States and of all foreign countries to issue any Letters Patent granted for the invention, whether on the application or on any subsequently filed division, continuation, continuation-in-part of reissue application, to Assignee, its successors and assigns, as the assignee of the entire interest in the invention.

IN WITNESS WHEREOF, Assignors have executed this Assignment.

Assignor:

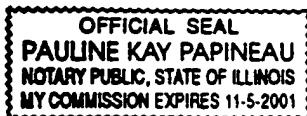
Date: 7/27/2001

Prem S Singh
Prem S. Singh

State of Illinois)
County of DeWitt) ss.

On July 27, 2001, Prem S. Singh, personally known to me -OR- proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.



Pauline Kay Papineau
Notary Public

NML PAS346516.1--7/27/01 1:17 PM

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PTO-003517



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UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
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APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/772,100	01/26/2001	Prem S. Singh	42892/KMO/C945

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SEP 28 2001

CONFIRMATION NO. 7975



OC000000006535154

Pretty & Schroeder, P.C.
19th Floor
444 S. Flower Street
Los Angeles, CA 90071

Christie, Parker & Hale, LLP

CASE # 42892 ACTION _____

REMINDER _____ DUE DATE _____

DEADLINE _____

Date Mailed: 09/10/2001

NOTICE REGARDING POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/04/2001.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record (37 CFR 1.33).

Oscar Ward

Customer Service Center

Initial Patent Examination Division (703) 308-1202

FORMER ATTORNEY/AGENT COPY

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CRPF07727

PTO-003518

PLEASE SIGN AND RETURN TO ACKNOWLEDGE RECEIPT

Title **HIGH TEMPERATURE METHOD FOR BROWNING
PREPARED, WHOLE MUSCLE MEAT
PRODUCTS**

Ser/Pat/Reg No: **09/772,100**
Filed/Issued : **January 26, 2001**

____ Assigned Enclosed (List Assignee)

Client ID **C945**

Case No **42892**

Atty/Sec **KMO:rm1**

Date Mailed **August 29, 2001**

Date Due ____

Cert of Mailing **Yes**

Express Mail No. ____

Checked by: 

DOCUMENT TITLE:
(List enclosures)

**Power of Attorney by Assignee to
Exclusion of Inventor**

ACKNOWLEDGE HERE

☒ PAT ____ COP ____ MARK ____ DBA

REV 11/93 FORM P2

CONFIDENTIAL

CRPF07728

PTO-003519

PLEASE SIGN AND RETURN TO ACKNOWLEDGE RECEIPT

Title **High Temperature Method for Browning
Precooked, Whole Muscle Meat Products**

Ser/Pat/Reg No: **09/772,100**
Filed/Issued : **January 26, 2001**

____ Assigned Enclosed (List Assignee)

DOCUMENT TITLE:
(List enclosures)

IDS, PTO 1449 w/references

Client ID: **945**

Case No: **42892**

Atty/Sec: **KMO/gmv**

Date Mailed: **August 8, 2001**

Date Due: **N/A**

Cert of Mailing: **Yes**

Express Mail No. _____

Checked by: 

ACKNOWLEDGE HERE

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REV 11/93 FORM P2

CONFIDENTIAL

CRPF07729

PTO-003520

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to Commissioner of Patents and Trademarks, Washington, D.C. 20231 on August 8, 2001.


Gina Vigiletti

Applicant : Prem S. Singh
Application No. : 09/772,100
Filed : January 26, 2001

Title : HIGH TEMPERATURE METHOD FOR BROWNING
PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS
Grp./Div. : 1761
Examiner : Not yet received

Docket No. : 42892/KMO/C945

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Post Office Box 7068
Pasadena, CA 91109-7068
August 8, 2001

Commissioner:

In compliance with the duty of disclosure under 37 CFR §§ 1.56, 1.97 and 1.98, and in accordance with the provisions in the Manual of Patent Examining Procedure §§ 609 and 707.05(b), enclosed is FORM PTO-1449 with a listing of references that are known to Applicant. Copies of each of the listed references are enclosed. To the best of the undersigned's knowledge, this Statement is being filed before the mailing date of a first Office action on the merits.

It is respectfully requested that these references be considered in the examination of this application and identified on the list of references cited on the patent issuing on this application.

CONFIDENTIAL

-1-

CRPF07730

PTO-003521

Application No.09/772,100

Applicant also requests that an initialed copy of said FORM PTO-1449 be entered in the application file and returned to Applicant with the next communication from the Office in accordance with MPEP § 609.

Respectfully submitted,

CHRISTIE, PARKER & HALE, LLP

By 

Kathleen M. Olster

Reg. No. 42,052

626/795-9900

KMO/gmv

Enclosures: PTO 1449, w/references

KMO PAS371360.1-*8/8/01 2:20 PM

CONFIDENTIAL

FORM PTO-1449 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)	Attorney Docket Number	42892/KMO/C945
	Application Number	09/772,100
	Filing Date	January 26, 2001
	Applicant(s)	Prem S. Singh
	Group Art Unit	1761
	Examiner Name	Not yet assigned

U.S. PATENT DOCUMENTS						
EXAMINER INITIALS	DOCUMENT NUMBER	ISSUE DATE	PATENTEE	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	1,280,772	10/1918	A.C. Legg			
	1,502,905	07/1924	Colgin			
	3,106,473	10/1963	Hollenbeck	99	229	
	4,372,981	02/1983	Lieberman	426	235	
	4,657,765	04/1987	Nicholson et al	426	250	
	4,753,809	06/1988	Webb	426	235	
	4,810,510	03/1989	Lever et al	426	233	
	4,876,108	10/1989	Underwood et al	426	650	
	4,882,184	11/1989	Buckholz et al	426	243	
	4,968,522	11/1990	Steinke et al	426	602	
	4,985,261	01/1991	Kang et al	426	243	
	4,994,297	02/1991	Underwood et al	426	650	
	5,013,567	05/1991	Govenius	426	314	
	5,039,537	08/1991	Underwood	426	271	
	5,292,541	03/1994	Underwood et al	426	250	
	5,397,582	03/1995	Underwood et al	426	250	
	5,429,831	07/1995	Williams et al	426	92	
	5,762,985	06/1998	Eisele	426	315	
	5,952,027	09/1999	Singh	426	305	

FOREIGN PATENT DOCUMENTS							
EXAMINER INITIALS	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY OR PATENT OFFICE	CLASS	SUBCLASS	TRANSLATION	
						YES	NO

EXAMINER SIGNATURE		DATE CONSIDERED	
EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609: Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			

Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Sheet 1 of 2

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CRPF07732

PTO-003523

FORM PTO-1449 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)	Attorney Docket Number	42892/KMO/C945
	Application Number	09/772,100
	Filing Date	January 26, 2001
	Applicant(s)	Prem S. Singh
	Group Art Unit	1761
	Examiner Name	

FOREIGN PATENT DOCUMENTS							
EXAMINER INITIALS	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY OR PATENT OFFICE	CLASS	SUBCLASS	TRANSLATION	
						YES	NO

OTHER DOCUMENTS	
EXAMINER INITIALS	Include name of the author (in CAPITAL LETTERS), title of the article, title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.

EXAMINER SIGNATURE		DATE CONSIDERED	
EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			

Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

KMO/gmv

GM: PAS371376.1-8/8/01 9:32 AM

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Sheet 2 of 2

PTO-003524

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to Commissioner of Patents and Trademarks, Washington, D.C. 20231 on August 8, 2001.


Gina Vigiletti

Applicant : Prem S. Singh
Application No. : 09/772,100
Filed : January 26, 2001

Title : HIGH TEMPERATURE METHOD FOR BROWNING
PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS
Grp./Div. : 1761
Examiner : Not yet received
Docket No. : 42892/KMO/C945

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Post Office Box 7068
Pasadena, CA 91109-7068
August 8, 2001

Commissioner:

In compliance with the duty of disclosure under 37 CFR §§ 1.56, 1.97 and 1.98, and in accordance with the provisions in the Manual of Patent Examining Procedure §§ 609 and 707.05(b), enclosed is FORM PTO-1449 with a listing of references that are known to Applicant. Copies of each of the listed references are enclosed. To the best of the undersigned's knowledge, this Statement is being filed before the mailing date of a first Office action on the merits.

It is respectfully requested that these references be considered in the examination of this application and identified on the list of references cited on the patent issuing on this application.

CONFIDENTIAL

-1-

CRPF07734

PTO-003525

Application No.09/772,100

Applicant also requests that an initialed copy of said FORM PTO-1449 be entered in the application file and returned to Applicant with the next communication from the Office in accordance with MPEP § 609.

Respectfully submitted,

CHRISTIE, PARKER & HALE, LLP

By


Kathleen M. Olster

Reg. No. 42,052

626/795-9900

KMO/gmv

Enclosures: PTO 1449, w/references

KMO PAS371360.1-* 8/8/01 2:20 PM

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-2-

CRPF07735

PTO-003526

FORM PTO-1449 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)	Attorney Docket Number	42892/KMO/C945
	Application Number	09/772,100
	Filing Date	January 26, 2001
	Applicant(s)	Prem S. Singh
	Group Art Unit	1761
	Examiner Name	Not yet assigned

U.S. PATENT DOCUMENTS						
EXAMINER INITIALS	DOCUMENT NUMBER	ISSUE DATE	PATENTEE	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	1,280,772	10/1918	A.C. Legg			
	1,502,905	07/1924	Colgin			
	3,106,473	10/1963	Hollenbeck	99	229	
	4,372,981	02/1983	Lieberman	426	235	
	4,657,765	04/1987	Nicholson et al	426	250	
	4,753,809	06/1988	Webb	426	235	
	4,810,510	03/1989	Lever et al	426	233	
	4,876,108	10/1989	Underwood et al	426	650	
	4,882,184	11/1989	Buckholz et al	426	243	
	4,968,522	11/1990	Steinke et al	426	602	
	4,985,261	01/1991	Kang et al	426	243	
	4,994,297	02/1991	Underwood et al	426	650	
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	5,762,985	06/1998	Eisele	426	315	
	5,952,027	09/1999	Singh	426	305	

FOREIGN PATENT DOCUMENTS							
EXAMINER INITIALS	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY OR PATENT OFFICE	CLASS	SUBCLASS	TRANSLATION	
						YES	NO

EXAMINER SIGNATURE		DATE CONSIDERED	
EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			

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Sheet 1 of 2

CRPF07736

PTO-003527

FORM PTO-1449 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)	Attorney Docket Number	42892/KMO/C945
	Application Number	09/772,100
	Filing Date	January 26, 2001
	Applicant(s)	Prem S. Singh
	Group Art Unit	1761
	Examiner Name	

FOREIGN PATENT DOCUMENTS							
EXAMINER INITIALS	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY OR PATENT OFFICE	CLASS	SUBCLASS	TRANSLATION	
						YES	NO

OTHER DOCUMENTS	
EXAMINER INITIALS	Include name of the author (in CAPITAL LETTERS), title of the article, title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.

EXAMINER SIGNATURE		DATE CONSIDERED	
EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			

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KMO/gmv

GM: PAS371376 1--8/8/01 9:32 AM

CONFIDENTIAL

CRPF07737

Sheet 2 of 2

PTO-003528

Title **HIGH TEMPERATURE METHOD FOR BROWNING PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS**

Ser/Pat/Reg No: 09/772,100
Filed/Issued : January 26, 2001

X Assigned Enclosed (List Assignee)
Swift-Eckrich, Inc.

Client ID	C945
Case No	42892
Atty/Sec	KMO:mal
Date Mailed	July 30, 2001
Date Due	July 30, 2001
Cert of Mailing	Yes
Express Mail No.	

DOCUMENT TITLE:
(List enclosures)

Check for \$441.020.00
Cover sheet for Response to Missing Parts
Copy of Notice of Missing Parts
Executed Declaration/~~Response~~
Petition for Ext/Time; Check for \$390.00
Assignment document; check for \$40.00; cover sheets in a separate
envelope addressed to BOX ASSIGNMENT

Checked by:

ACKNOWLEDGE HERE

 PAT COP MARK DBA

REV 11/93 FORM P2

CONFIDENTIAL

CRPF07738

PTO-003529

CASE NO & ATTORNEY

CHRISTIE, PARKER & HALE

P.O. BOX 7068

C945:42892/KMD

PASADENA, CALIFORNIA 91109-7068

153200

16-24
1220WELLS FARGO BANK
350 W COLORADO BLVD
PASADENA, CA 91105PAY \$ ~~1~~1,020.00**

NOT VALID IN EXCESS OF \$3,000.00

DATE

JUL 30, 1991

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OF

COMMISSIONER OF PATENTS & TRADEMARKS

WASHINGTON, D.C. 20231



NOT NEGOTIABLE

4 2 2 0 0 0 2 4 7 0 6 1 4 0 4 7 1 8 1 7

REMITTANCE ADVICE

PLEASE DETACH BEFORE DEPOSITING CHECK

CLIENT NAME	CASE NO. & ATTORNEY	CHECK APPROPRIATE ITEM TO BE CHARGED
ConAgra Refrigerated Prepared Foods C945	42892/KMD	<input type="checkbox"/> ISSUE FEE <input type="checkbox"/> ADVANCE ORDER OF PATENT COPIES <input type="checkbox"/> FILING AND RECORDING FEE <input checked="" type="checkbox"/> FILING FEE \$1,020.00 <input type="checkbox"/> RECORDING FEE <input type="checkbox"/> FEE FOR ADDITIONAL CLAIMS <input type="checkbox"/> FEE FOR EXTENSION OF TIME <input type="checkbox"/> FILING FEE FOR SIXTH-YEAR DECLARATION <input type="checkbox"/> RENEWAL FEE <input type="checkbox"/> MAINTENANCE FEE <input type="checkbox"/> OTHER

USE SEPARATE CHECK FOR EACH CLIENT AND CASE NUMBER

CHRISTIE, PARKER & HALE

P.O. BOX 7068

PASADENA, CALIFORNIA 91109-7068

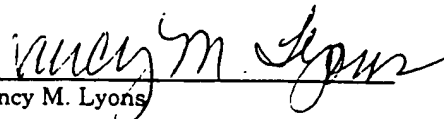
CONFIDENTIAL

CRPF07739

PTO-003530

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to Commissioner of Patents and Trademarks, Washington, D.C. 20231 on July 30, 2001.


Nancy M. Lyons

Applicant : Prem S. Singh
Application No. : 09/772,100
Filed : January 26, 2001
Title : HIGH TEMPERATURE METHOD FOR BROWNING
PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS
Grp./Div. : 1761
Examiner : Not Yet Assigned
Docket No. : 42892/KMO/C945

LETTER IN RESPONSE TO NOTICE TO
FILE MISSING PARTS OF APPLICATION

Box Missing Parts
Assistant Commissioner for Patents
Washington, D.C. 20231

P.O. Box 7068
Pasadena, CA 91109-7068
July 30, 2001

Commissioner:

In response to the Notice to File Missing Parts of Application dated March 30, 2001, enclosed are:

1. Copy of Notice to File Missing Parts of Application.
2. A Petition for Extension of Time.
3. Extension of Time fee of \$390.00.
4. Check for \$1,020.00, including the filing fee (\$890.00) and surcharge (\$130.00) for a large entity.
5. Executed Declaration and Power of Attorney.
6. An Assignment of the invention with the Recordation Form Cover Sheet in a separate envelope addressed to Commissioner of Patents and Trademarks, Box Assignments Washington, D.C. 20231, along with our check for \$40.00.

CONFIDENTIAL

-1-

CRPF07740

PTO-003531

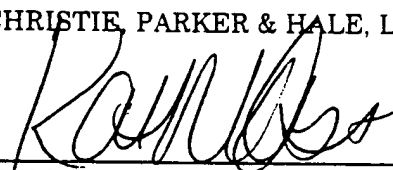
Application No. 09/772,100

The Commissioner is hereby authorized to charge any fees under 37 CFR 1.16 and 1.17 which may be required during the pendency of this application to Deposit Account No. 03-1728. Please show our docket number with any charge or credit to our Deposit Account. A copy of this letter is enclosed.

Respectfully submitted,

CHRISTIE PARKER & HALE, LLP

By


Kathleen M. Olster
Reg. No. 42,052
626/795-9900

KMO/nml

Enclosures: As noted above

NML PAS368842.1.*-7/30/01 9:19 AM

CONFIDENTIAL

-2-

CRPF07741

PTO-003532



UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
09/772,100	01/26/2001	Prem S. Singh	SECKR-045059

CONFIRMATION NO. 7975

FORMALITIES LETTER



OC000000005920639

Pretty & Schroeder, P.C.
19th Floor
444 S. Flower Street
Los Angeles, CA 90071

Date Mailed: 03/30/2001

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given TWO MONTHS from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 710 to complete the basic filing fee and/or file a small entity statement claiming such status (37 CFR 1.27).
- Total additional claim fee(s) for this application is \$180.
 - \$180 for 10 total claims over 20.
- The oath or declaration is unsigned.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.
- The balance due by applicant is \$ 1020.

*A copy of this notice **MUST** be returned with the reply.*



Customer Service Center

Initial Patent Examination Division (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE

CONFIDENTIAL

CRPF07742

PTO-003533

DECLARATION
FOR PATENT APPLICATION

PATENT

Docket No. : 42892/KMO/C945

As a below named inventor, I hereby declare that:

My residence, mailing address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled HIGH TEMPERATURE METHOD FOR BROWNING PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS, the specification of which is attached hereto unless the following is checked:

X was filed on January 26, 2001 as United States Application Number or PCT International Application Number 09/772,100 and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of the foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application, which designated at least one country other than the United States of America, listed below and have also identified below, any foreign application for patent or inventor's certificate, or any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

<u>Application Number</u>	<u>Country</u>	<u>Filing Date (day/month/year)</u>
<u>Priority Claimed</u>		

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

<u>Application Number</u>	<u>Filing Date</u>
---------------------------	--------------------

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112.

<u>Application Number</u>	<u>Filing Date</u>	<u>Patented/Pending/Abandoned</u>
---------------------------	--------------------	-----------------------------------

DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION

Docket No. 42892/KMO/C945

DIRECT TELEPHONE CALLS TO: Kathleen M. Olster, 626/795-9900

SEND CORRESPONDENCE TO: Customer Number: 23363
CHRISTIE, PARKER & HALE, LLP
P.O. Box 7068
Pasadena, CA 91109-7068

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR			
Prem S. Singh		<i>Prem S Singh</i>	
Inventor's Signature			Date 7-27-2001
City Residence: Glenellyn	State Illinois	Country United States	Citizenship US
Mailing Address: 148 Spring Avenue, Glenellyn, Illinois 60137			

KMO:nml
NWL PAS346528 1--7/27/01 1:37 PM

CONFIDENTIAL

CRPF07744

PTO-003535

CASE NO. & ATTORNEY

CHRISTIE, PARKER & HALE

P.O. BOX 7068

C945:42892/KMD:rm1

PASADENA, CALIFORNIA 91109-7068

16-24
1220

158205

WELLS FARGO BANK
360 W. COLORADO BLVD.
PASADENA, CA 91105

PAY \$**390.00**

NOT VALID IN EXCESS OF \$3,000.00

DATE

JUL 30 1991

TO THE
ORDER
OFCOMMISSIONER OF PATENTS & TRADEMARKS
WASHINGTON, D.C. 20231

NOT NEGOTIABLE

⑆ 1 2 2 0 0 0 2 4 7 1 5 0 6 1 4 0 4 7 1 8 1 ⑆

REMITTANCE ADVICE

PLEASE DETACH BEFORE DEPOSITING CHECK

CLIENT NAME	CASE NO. & ATTORNEY	CHECK APPROPRIATE ITEM TO BE CHARGED
ConAgra Refrigerated Prepared Foods C945	42892/KMD	<input type="checkbox"/> ISSUE FEE <input type="checkbox"/> ADVANCE ORDER OF PATENT COPIES <input type="checkbox"/> FILING AND RECORDING FEE <input type="checkbox"/> FILING FEE <input type="checkbox"/> RECORDING FEE <input type="checkbox"/> FEE FOR ADDITIONAL CLAIMS <input checked="" type="checkbox"/> FEE FOR EXTENSION OF TIME \$390.00 <input type="checkbox"/> FILING FEE FOR SIXTH-YEAR DECLARATION <input type="checkbox"/> RENEWAL FEE <input type="checkbox"/> MAINTENANCE FEE <input type="checkbox"/> OTHER

USE SEPARATE CHECK FOR EACH CLIENT AND CASE NUMBER

CHRISTIE, PARKER & HALE

P.O. BOX 7068

PASADENA, CALIFORNIA 91109-7068

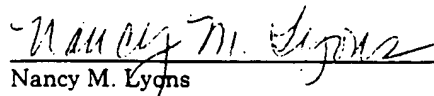
CONFIDENTIAL

CRPF07745

PTO-003536

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
PETITION FOR EXTENSION OF TIME
FROM THE NOTICE OF MISSING PARTS**

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to Commissioner of Patents and Trademarks, Washington, D.C. 20231 on July 30, 2001.


Nancy M. Lyons

Applicant : Prem S. Singh
Application No. : 09/772,100
Filed : January 26, 2001
Title : HIGH TEMPERATURE METHOD FOR BROWNING
PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS
Grp./Div : 1761
Examiner : Not Yet Assigned

Docket No. : 42892/KMO/C945

Assistant Commissioner for Patents
Washington, D.C. 20231

Post Office Box 7068
Pasadena, CA 91109-7068
July 30, 2001

Commissioner:

Applicant petitions the Commissioner to extend the time for response to the Office action dated March 30, 2001 for two month(s) from May 30, 2001 to July 30, 2001.

The fee for extension of time required by 37 CFR § 1.17 is calculated below.

CALCULATION OF FEE			
LENGTH OF EXTENSION	SMALL ENTITY	LARGE ENTITY	FEE
WITHIN FIRST MONTH	\$ 55	\$110	\$
WITHIN SECOND MONTH	\$195	\$390	\$390.00
WITHIN THIRD MONTH	\$445	\$890	\$
WITHIN FOURTH MONTH	\$695	\$1390	\$
WITHIN FIFTH MONTH	\$945	\$1890	\$

Submitted herewith is a check for \$ 390.00 to cover the cost of the extension.


PETITION FOR EXTENSION OF TIME
Application No. 09/772,100

The Commissioner is hereby authorized to charge any fees under 37 CFR 1.16 and 1.17 which may be required by this paper to Deposit Account No. 03-1728. Please show our docket number with any charge or credit to our Deposit Account. A copy of this letter is enclosed.

Respectfully submitted,

CHRISTIE, PARKER & HALE, LLP

By


Kathleen M. Olster
Reg. No. 42,052
626/795-9900

KMO/nml

NML PAS368839.1.*-7/30/01 9:17 AM

CASE NO. & ATTORNEY

CHRISTIE, PARKER & HALE

P.O. BOX 7068

PASADENA, CALIFORNIA 91109-7068

C945:42892/KMD:mhl16-24
1220

156204

WELLS FARGO BANK
360 W. COLORADO BLVD.
PASADENA, CA 91105

PAY \$ **40.00**

NOT VALID IN EXCESS OF \$3,000.00

DATE

JUL 30 2001

TO THE
ORDER
OFCOMMISSIONER OF PATENTS & TRADEMARKS
WASHINGTON, D.C. 20231

NOT NEGOTIABLE

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REMITTANCE ADVICE

PLEASE DETACH BEFORE DEPOSITING CHECK

CLIENT NAME	CASE NO. & ATTORNEY	CHECK APPROPRIATE ITEM TO BE CHARGED
ConAgra Refrigerated Prepared Foods C945	42892/KMD	<input type="checkbox"/> ISSUE FEE <input type="checkbox"/> ADVANCE ORDER OF PATENT COPIES <input type="checkbox"/> FILING AND RECORDING FEE <input type="checkbox"/> FILING FEE <input checked="" type="checkbox"/> RECORDING FEE \$40.00 <input type="checkbox"/> FEE FOR ADDITIONAL CLAIMS <input type="checkbox"/> FEE FOR EXTENSION OF TIME <input type="checkbox"/> FILING FEE FOR SIXTH-YEAR DECLARATION <input type="checkbox"/> RENEWAL FEE <input type="checkbox"/> MAINTENANCE FEE <input type="checkbox"/> OTHER

USE SEPARATE CHECK FOR EACH CLIENT AND CASE NUMBER

CHRISTIE, PARKER & HALE

P.O. BOX 7068

PASADENA, CALIFORNIA 91109-7068

CONFIDENTIAL

CRPF07748

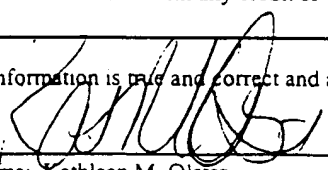
PTO-003539

RECORDATION FORM COVER SHEET PATENTS ONLY

Box Assignment
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Post Office Box 7068
Pasadena, CA 91109-7068

Commissioner of Patents and Trademarks: Please record the attached original documents or copy thereof:

1. Name of conveying party(ies): Prem S. Singh Additional name(s) of conveying party(ies) attached: No		2. Name and address of receiving party(ies): Name: Swift-Eckrich, Inc. Street Address: 2001 Butterfield Road Downers Grove, Illinois 60515-1049			
3. Name of conveyance: <input checked="" type="checkbox"/> Assignment <input type="checkbox"/> Merger <input type="checkbox"/> Security Agreement <input type="checkbox"/> Change of Name <input type="checkbox"/> Other: Execution Date: July 27, 2001		Additional name(s) & address(es) attached? No			
4. Application number(s) or patent number(s): If this document is being filed together with a new application, the execution date of the application is: . <table border="0"> <tr> <td style="width: 50%;"> A. Patent Application No.(s) 09/772,100 </td> <td style="width: 50%;"> B. Patent No.(s) </td> </tr> </table>				A. Patent Application No.(s) 09/772,100	B. Patent No.(s)
A. Patent Application No.(s) 09/772,100	B. Patent No.(s)				
Additional numbers attached? No					
5. Please return the recorded document and address all correspondence to: CHRISTIE, PARKER & HALE, LLP P.O. Box 7068 Pasadena, CA 91109-7068 Attention: Kathleen M. Olster		6. Total number of applications and patents involved..... 1			
10. <input type="checkbox"/> Explanatory letter is enclosed.		7. <input checked="" type="checkbox"/> Total fee enclosed (37 CFR 3.41): \$ 40.00 8. <input checked="" type="checkbox"/> Any deficiency or overpayment of fees should be charged or credited to Deposit Account No. 03-1728, except for payment of issue fees required under 37 CFR § 1.18. Please show our docket number with any credit or charge to our Deposit Account.			
9. Statement and signature. To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document. Date: July 30, 2001 By  Name: Kathleen M. Olster 626/795-9900 I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE U.S. POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO: ASSISTANT COMMISSIONER FOR PATENT, WASHINGTON, D.C. 20231 ON <u>7/30/01</u> <u>Kathleen M. Olster</u> DATE SIGNATURE Total number of pages including cover sheet, attachments, and document: 3					

KMO/nml

NML PAS368957 1.-.7/30/01 10:35 AM

CONFIDENTIAL

CRPF07749

PTO-003540

ASSIGNMENT

WHEREAS, Prem S. Singh, of 148 Spring Avenue, Glenelg, Illinois, 60137, Assignor, has invented a new and useful **HIGH TEMPERATURE METHOD FOR BROWNING PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS** for which an application for United States Letters Patent was filed on January 26, 2001, Application No. 09/772,100, and

WHEREAS, Assignor believes himself to be the original, first and sole inventor of the invention disclosed and claimed in the application for Letters Patent; and

WHEREAS, Swift-Eckrich, Inc., an Illinois corporation, having a place of business at 2001 Butterfield Road, Downers Grove, Illinois, 60515-1049, Assignee, desires to acquire by formal, recordable assignment the entire right, title and interest in and to the invention, the application, and any Letters Patent that might be granted for the invention in the United States and throughout the world;

NOW, THEREFORE, in consideration of the sum of Ten Dollars (\$10.00) and of other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby sells, assigns and transfers to Assignee, the entire right, title and interest in and to the invention, the application, and any Letters Patent that might be granted for the invention in the United States and throughout the world, including the right to file foreign applications directly in the name of Assignee and to claim for any such foreign applications any priority rights to which such applications are entitled under international conventions, treaties or otherwise.

Further, Assignor agrees that, upon request and without further compensation, but at no expense to Assignor, he and his legal representatives and assigns will perform all lawful acts, including the execution of papers and the giving of testimony, that might be necessary or desirable for obtaining, sustaining, reissuing or enforcing Letters Patent in the United States and throughout the world for the invention, and for perfecting, recording or maintaining the title of Assignee, its successors and assigns, to the invention, the application, and any Letters Patent granted for the invention in the United States and throughout the world.

Assignor represents and warrants that he has not granted and will not grant to others any rights inconsistent with the rights granted by this Assignment.

CONFIDENTIAL

CRPF07750

PTO-003541

Assignor authorizes and requests the Commissioner of Patents and Trademarks of the United States and of all foreign countries to issue any Letters Patent granted for the invention, whether on the application or on any subsequently filed division, continuation, continuation-in-part of reissue application, to Assignee, its successors and assigns, as the assignee of the entire interest in the invention.

IN WITNESS WHEREOF, Assignors have executed this Assignment.

Assignor:

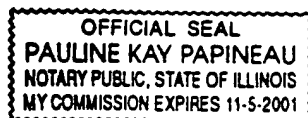
Date: 7/27/2001

Prem S. Singh
Prem S. Singh

State of Illinois)
County of DeWitt) ss.

On July 27, 2001, Prem S. Singh, personally known to me -OR- proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.



Pauline Kay Papineau
Notary Public

NML PAS346516.1-7/27/01 1:17 PM

CONFIDENTIAL

CRPF07751

PTO-003542



UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO.	DRAWINGS	TOT CLAIMS	IND CLAIMS
09/772,100	01/26/2001	1761	1020	42892/KMO/C945		30	3

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Page 1 of 3

SEP 05 2001

Christie, Parker & Hale, LLP

① KMO
② RAS

CONFIRMATION NO. 7975

UPDATED FILING RECEIPT



OC000000006477738

Pretty & Schroeder, P.C.
19th Floor
444 S. Flower Street
Los Angeles, CA 90071CASE # C945: 42892 ACTION _____
REMINDER _____ DUE DATE _____
DEADLINE _____

Date Mailed: 08/27/2001

Receipt is acknowledged of this nonprovisional Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Customer Service Center. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).

Applicant(s)

Prem S. Singh, Glenellyn, IL;

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted 03/29/2001

Projected Publication Date: 08/01/2002

Non-Publication Request: No

Early Publication Request: No

Title

High temperature method for browning precooked, whole muscle meat products

Preliminary Class

426

CONFIDENTIAL

Data entry by : MOGUSS, ZENEBEWORK

Team : OIPE

Date: 08/27/2001

CRPF07752

PTO-003543

CONFIDENTIAL

CRPF07753

PTO-003544

**LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Cod , Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15**

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Office of Export Administration, Department of Commerce (15 CFR 370.10 (j)); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

PLEASE NOTE the following information about the Filing Receipt:

- The articles such as "a," "an" and "the" are not included as the first words in the title of an application. They are considered to be unnecessary to the understanding of the title.
- The words "new," "improved," "improvements in" or "relating to" are not included as first words in the title of an application because a patent application, by nature, is a new idea or improvement.
- The title may be truncated if it consists of more than 500 characters (letters and spaces combined).
- The docket number allows a maximum of 25 characters.
- If your application was submitted under 37 CFR 1.10, your filing date should be the "date in" found on the Express Mail label. If there is a discrepancy, you should submit a request for a corrected Filing Receipt along with a copy of the Express Mail label showing the "date in."
- The title is recorded in sentence case.

Any corrections that may need to be done to your Filing Receipt should be directed to:

Assistant Commissioner for Patents
Office of Initial Patent Examination
Customer Service Center
Washington, DC 20231

CONFIDENTIAL

CRPF07754

PTO-003545

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APR 13 2001



UNITED STATES PATENT AND TRADEMARK OFFICE

Christie, Parker & Hale, LLP

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO.	DRAWINGS	TOT CLAIMS	IND CLAIMS
09/772,100	01/26/2001	1761	0.00	SECKR-045059		30	3

CONFIRMATION NO. 7975

FILING RECEIPT

Pretty & Schroeder, P.C.
19th Floor
444 S. Flower Street
Los Angeles, CA 90071

CASE # 42892 ACTION _____
REMINDER _____ DUE DATE _____
DEADLINE _____



OC000000005920638

Date Mailed: 03/30/2001

Receipt is acknowledged of this nonprovisional Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Customer Service Center. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the PTO processes the reply to the Notice, the PTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).

Applicant(s)

Prem S. Singh, Glenellyn, IL;

Continuing Data as Claimed by Applicant

Foreign Applications

If Required, Foreign Filing License Granted 03/29/2001

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

Title

High temperature method for browning precooked, whole muscle meat products

Preliminary Class

426

CONFIDENTIAL

CRPF07755

PTO-003546

Data entry by : TADESSE, ETAGEAN

Team : OIPE

Date: 03/30/2001

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Titl 37, Code of Federal Regulations, 5.11 & 5.15**

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No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15 (b).

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CRPF07759

PTO-003550

Please acknowledge receipt of the accompanying:

☒ Utility Application

☐ Design Application

Applicant's Name Prem Singh

Title HIGH TEMPERATURE METHOD FOR BROWNING
PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS

☒ Pages of Spec. -19-

No. of Claims -30-

☐ Sheets of Drawings

☒ Declaration or Oath

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CRPF07760

PTO-003551

UTILITY PATENT APPLICATION TRANSMITTAL (Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
SECKR-045059

Total Pages in this Submission
20

TO THE ASSISTANT COMMISSIONER FOR PATENTS

B x Patent Application
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

HIGH TEMPERATURE METHOD FOR BROWING PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS

and invented by:

PREM S. SINGH

If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

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Enclosed are:

Application Elements

1. ☐ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 18 pages and including the following:
 - a. ☒ Descriptive Title of the Invention
 - b. ☐ Cross References to Related Applications (if applicable)
 - c. ☐ Statement Regarding Federally-sponsored Research/Development (if applicable)
 - d. ☐ Reference to Microfiche Appendix (if applicable)
 - e. ☒ Background of the Invention
 - f. ☒ Brief Summary of the Invention
 - g. ☒ Brief Description of the Drawings (if drawings filed)
 - h. ☒ Detailed Description
 - i. ☒ Claim(s) as Classified Below
 - j. ☒ Abstract of the Disclosure

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UTILITY PATENT APPLICATION TRANSMITTAL
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(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
SECKR-045059

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Application Elements (Continued)

3. ☐ Drawing(s) *(when necessary as prescribed by 35 USC 113)*
- a. ☐ Formal Number of Sheets _____
- b. ☐ Informal Number of Sheets _____
4. ☒ Oath or Declaration
- a. ☐ Newly executed *(original or copy)* ☒ Unexecuted
- b. ☐ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
- c. ☐ With Power of Attorney ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application,
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference *(usable if Box 4b is checked)*
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Computer Program in Microfiche *(Appendix)*
7. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*
- a. ☐ Paper Copy
- b. ☐ Computer Readable Copy *(identical to computer copy)*
- c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☐ Assignment Papers *(cover sheet & document(s))*
9. ☐ 37 CFR 3.73(B) Statement *(when there is an assignee)*
10. ☐ English Translation Document *(if applicable)*
11. ☐ Information Disclosure Statement/PTO-1449 ☐ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Acknowledgment postcard
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**UTILITY PATENT APPLICATION TRANSMITTAL
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Accompanying Application Parts (Continued)

15. ☐ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
16. ☐ Additional Enclosures *(please identify below):*

Request That Application Not Be Published Pursuant To 35 U.S.C. 122(b)(2)

17. ☐ Pursuant to 35 U.S.C. 122(b)(2), Applicant hereby requests that this patent application not be published pursuant to 35 U.S.C. 122(b)(1). Applicant hereby certifies that the invention disclosed in this application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing of the application.

Warning

An applicant who makes a request not to publish, but who subsequently files in a foreign country or under a multilateral international agreement specified in 35 U.S.C. 122(b)(2)(B)(i), must notify the Director of such filing not later than 45 days after the date of the filing of such foreign or international application. A failure of the applicant to provide such notice within the prescribed period shall result in the application being regarded as abandoned, unless it is shown to the satisfaction of the Director that the delay in submitting the notice was unintentional.

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UTILITY PATENT APPLICATION TRANSMITTAL
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Fee Calculation and Transmittal

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For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	30	- 20 =	10	x \$18.00	\$180.00
Indep. Claims	3	- 3 =	0	x \$80.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$710.00
OTHER FEE (specify purpose) _____					\$0.00
TOTAL FILING FEE					\$890.00

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☐ The Commissioner is hereby authorized to charge and credit Deposit Account No. _____ as described below. A duplicate copy of this sheet is enclosed.

- ☐ Charge the amount of _____ as filing fee.
☐ Credit any overpayment.
☐ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

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Dated: January 26, 2001

Signature
Jeffrey F. Craft, Reg. No. 30,044
Pretty & Schroeder, P.C.
444 S. Flower Street, 19th Floor
Los Angeles, CA 90071
213-622-7700 Tel.
213-489-4210 Fax

CRPF07764

cc:

UTILITY APPLICATION

OF

PREM S. SINGH

FOR

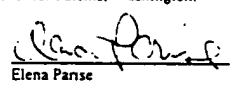
UNITED STATES PATENT

ON

HIGH TEMPERATURE METHOD FOR BROWNING

PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS

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PRETTY & SCHROEDER, P.C.
444 South Flower Street, 19th Floor
Los Angeles, California 90071
213-622-7700

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HIGH TEMPERATURE METHOD FOR BROWNING PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS

BACKGROUND OF THE INVENTION

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1. Field of the Invention

This invention relates to a method of preparing food products. In particular, it relates to an improved method for browning precooked, whole muscle meat products.

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2. Description of Related Art

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Consumers' demand for precooked, prebrowned whole muscle meat products having the same appearance, texture, taste, flavor and other organoleptic characteristics as whole muscle meat products naturally smoked or baked or roasted in a home-style oven has been increasing. Consumers prefer precooked products which offer the visual and taste experience of the food they prepare at home. For example, there are some whole muscle meat products cooked in netting, in part to give a pleasing, patterned appearance to the products' browned surfaces.

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In addition, consumers today are increasingly conscious about the nutritional value and wholesomeness of the products they eat. Therefore, successful precooked, whole muscle meat products satisfying the sophisticated consumers of today must not only be convenient and affordable, but must, to the greatest extent possible, give the eating experience associated with home-cooked foods and must be wholesome and safe.

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There are numerous methods for browning precooked, whole muscle meat products. Frying in various kinds of edible seed oil, such as peanut oil, cotton seed oil, corn oil, coconut oil, sunflower oil, etc. is the most popular method of browning the surface of precooked, whole muscle to give the desired brown color, crispy texture and flavor to the product. Frying usually is done in oil having a temperature ranging from about 150°C to 230°C. Production of desired color, flavor and texture is accomplished by the well-known

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Maillard Browning Reaction as the common elements of the whole muscle meat products, such as amino acids, sugars, collagen and minerals, react in a complex manner.

5 Another conventional approach to browning precooked, whole muscle meat products begins with the application to the surface of the meat products of certain browning liquids produced by pyrolyzing wood or cellulose, *i.e.*, "liquid smoke." These pyrolysis products are intended to develop a brown color on the product surface when the coated product is heated for about two hours to six hours in a batch-type oven with air-circulation at a temperature of from about 50°C to 100°C or for about ten to forty-five minutes in a
10 circulating air oven, or in an impingement air oven at a temperature from about 120°C to 320°C.

However, significant drawbacks remain with the conventional method of browning whole meat muscle products. After being heated to temperatures of from about 120° to
15 320°C, the meat products lose a significant amount of water, which can adversely affect their taste and appearance.

Further, the uniformity of browning obtained with the pyrolysis products and the retention and stability of the brown coating, as well as the color itself, is less than desirable.
20 Still further, because the whole meat muscle products are heated at elevated temperatures for relatively long periods of time, the growth of microbes may be facilitated, thus potentially decreasing the shelf-life of the browned whole muscle meat products. It is a further disadvantage of heating whole meat muscle products at elevated temperatures for relatively long periods of time that large amounts of heat are captured by the product. The
25 product must then be chilled, *i.e.*, the large amount of heat removed. Typically, chilling requires a lengthy, capital-intensive chill tunnel with attendant high operating costs.

These problems can be exacerbated when the product is precooked in a net. During cooking, the netted pattern will penetrate or "dig in" into cooked meat to leave the desired
30 pattern on the surface. When the netting is removed, however, it can leave rough, jagged

edges projecting from the surface. These edges tend to char and burn when the precooked product is browned using conventional techniques.

5 An improved method of consistently producing a desirable, uniform, brown color, which is comparatively efficient and rapid, is as described in Singh U.S. Pat. No. 5,952,027. This process can not only produce a consistent golden-brown color which consumer likes, but is also relatively efficient, because it exposes the whole muscle meat product to an energy source that selectively heats the product surface in a way that produces the desired golden-brown color. The patent describes heating the meat product in an environment
10 having a temperature greater than about 60°C, preferably from about 100°C to about 290°C, and most preferably from about 150°C to about 260°C. While this method provides significant advantages over other methods of browning precooked whole muscle meat products, improvements to this process are desirable. In particular, it remains a desideratum for a further improved process that still further reduces the amount of heat captured by the
15 product, and thus reduces the amount of heat that must be removed, while producing the crisp surface and imparting the uniform golden-brown to mahogany-brown color expected by consumers.

 Thus, there remains a definite desire for a further improved method for browning
20 precooked, whole muscle meat products, including products having edges that are highly susceptible to burning and charring, such as products precooked in netting, to produce products having the appearance, texture, taste, flavor, and other organoleptic characteristics of their naturally smoked or home-style baked or roasted counterparts. There remains a further desire for an improved method for crisping and browning the surface of precooked,
25 whole muscle meat products without deep frying. There also remains a desire for an improved method for crisping and browning the surface of precooked, whole muscle meat products that does not cause the products to shrink and the interior to become dried-out. There also remains a desire for an improved method for preparing whole muscle meat
30 products having a uniform golden-brown to mahogany-brown color that is stable and retained throughout the life of the product. There remains a still further desire for an

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improved method for crisping and browning a whole muscle meat product that does not adversely affect the shelf-life of the meat product and does not require the removal of great amounts of heat to chill the product. The present invention satisfies these and other requirements and provides other related advantages.

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SUMMARY OF THE INVENTION

The present invention, which addresses the above desires is embodied in a method of producing a crisp surface and imparting a uniform golden-brown to mahogany-brown color, without burning or charring, that is stable and retained throughout the life of a precooked, whole muscle meat product without imparting an objectionable smoky flavor, without forming an oily surface, without substantially shrinking the meat product, and without adversely affecting the shelf-life of the meat product, but instead increases the shelf-life and improves the sensory quality of the product. In some embodiments, a precooked whole muscle meat product, including a poultry product such as a turkey breast, a chicken breast, or chicken nugget, ham, pork, or fish, is predried to remove free water from its surface. In accordance with the inventive method, at least a portion of the surface of the precooked whole muscle meat product is coated with a browning liquid pyrolysis product. The coated surface is then exposed to an energy source that creates an environment having a temperature greater than about 400° C, preferably between about 425° C and 700° C, most preferably between about 450° C and 650° C, for a time sufficient to selectively heat the coated surface and develop a golden-brown to mahogany-brown color on the exposed surface, without burning or charring and without substantial shrinkage of the precooked, whole muscle meat product.

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In some embodiments the energy source is an infra red energy source and in some embodiments the whole muscle meat product is exposed to the energy source for three minutes or less or, preferably, for one minute or less. And in some embodiments, the temperature at the core of the meat product is initially less than about 5° C, while after the meat product has been browned, the temperature at the core of the meat product is no more

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than 6°C, preferably no more than 5°C.

5 The browning liquid pyrolysis product may be obtained from the pyrolysis of
hardwoods or sugars, including dextrose, and from about 0.05 to about 1.0 wt. %, based on
the weight of the precooked, whole muscle meat product, of the browning liquid is applied
to the surface of the meat product. Also in some embodiments, the browning liquid
pyrolysis product contains a masking agent or flavoring enhancing composition. Where the
whole muscle meat product is a turkey breast, the browning liquid pyrolysis product contains
from about 0.5 to about 15 wt. % turkey flavor or turkey broth or a mixture of the two as
10 the masking agent or flavoring enhancing composition.

Other features and advantages of the present invention will become apparent from
the following detailed description, which illustrates by way of example, the principles of the
invention.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A variety of whole meat muscle products can be advantageously browned in
accordance with the invention. Representative whole meat muscle products include poultry,
20 meat, and fish products, such as turkey breasts, chicken breasts, chicken nuggets, ham, pork,
and the like. The process is particularly useful in preparing deli-type, ready-to-eat, whole
meat muscle products, such as the turkey breast, chicken breast, ham and like products that
are sliced by deli counter operators just prior to sale to a consumers. Such products can be
made of multiple small whole muscle pieces joined together by further processing to create
25 the appearance of a whole muscle meat product formed from a single large piece.

In some embodiments, the raw, whole meat muscle is injected with a solution
containing salt, dextrose, tri-sodium polyphosphate, flavorings, and sodium nitrite, if the
product is to be "cured". The amount of solution injected into the whole muscle meat
30 product varies from zero to about 80%, based on the initial weight of the whole muscle meat

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product.

5 After injection, the whole muscle meat product is tumbled or massaged. Modern
tumblers for meat processing are stainless steel drums, which rotate with slip and slice
effect. The tumbling process is a physical process of transferring sufficient energy into
10 injected muscle meat or muscle pieces to facilitate the uniform distribution of injected
solution. Tumbling improves the ability of the muscles to be formed or shaped as required
of deli-type products after cooking and chilling. The tumbling process makes the individual
whole meat muscle pieces pliable or moldable and soft so that the surfaces of the adjacent
15 pieces can be formed seamlessly in cook-in-bags or in molds. If the whole meat muscle
pieces are not massaged, the pieces might not adhere to each other resulting in an
unacceptable product and excessive purge and loss in yield.

Furthermore, to create a meat protein surface suitable for bonding the muscles
15 together, a portion of salt soluble protein in the muscle must be extracted. Tumbling or
massaging will sufficiently extract enough protein from the meat to create a tacky protein
matrix on the surfaces of the muscle, which forms the strong bond during cooking and
chilling jointing the muscles together.

20 Additionally, tumbling or massaging causes the fragmentation of muscle fibers. This
fragmentation or disassociation of meat muscle fibers on the surface of muscle pieces helps
in adhering or unifying during further cooking and chilling. In some embodiments, after
injection and tumbling, the whole meat muscle product is stuffed in a netting bag. The
25 netting bag produces an attractive pattern on the surface of the whole meat muscle product
after cooking.

Suitable netting materials are available in rolls, presown or clipped pieces and
mandrels for large capability high speed processing. Suitable netting materials are well
known in the art. Representative materials include cotton and polymeric materials.
30 Polymeric materials have the advantage that they expand during cooking when the meat

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expands, but do not return to their original size during chilling when the meat contracts. This makes the polymer netting easily removable without loss of meat protein layer. Preferred polymeric netting materials include polyester/rubber materials, such as elastic latex rubber fiber based netting.

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After massaging or tumbling and stuffing into netting bags, the whole meat muscle product is placed in a polymeric cook-in-bag, under vacuum, and sealed. Alternatively, the whole muscle meat product is formed in a mold. The product is then placed on a rack in a smoke house or steam box or circulating air oven and cooked to a predetermined temperature, typically in the range of from about 68°C to 74°C. Once cooking is completed, the product is chilled by showering with cold water followed by cooling with chilled air to reduce its equilibrium temperature to less than about 4.4°C. The thus precooked, chilled whole muscle meat product is then removed from the cook-in-bag or from the mold.

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In some embodiments, the precooked, whole muscle meat product is then placed on a continuously moving conveyor and transported past a hot (e.g., from about 32°C to 100°C) water shower or steam for a period of from about ten to thirty seconds. The showers remove the gelatin purge formed on the surface of the meat product during cooking. It has been found that the inventive method is more effective if the browning liquid pyrolysis product is applied directly to the surface of the whole muscle meat product and not to an intermediate gelatin layer. Direct application promotes penetration of the browning liquid pyrolysis product into the meat tissue and facilitates the subsequent Maillard Browning Reaction.

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In one embodiment, after the gelatin purge is removed, the meat product is predried by, for example, circulating hot air around the product. It is also been found that when the free water on the surface of the meat product is removed by predrying, the Maillard Browning Reaction is enhanced.

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At least a portion of the surface of the thus dried, precooked, whole meat muscle product is then coated with one or more suitable browning liquid pyrolysis products, such

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as the browning liquid pyrolysis products commercially available from Red Arrow Products Company, Inc. of Manitowoc, Wisconsin, described in Hollenbeck U.S. Pat. No. 3,106,473 and Underwood U.S. Pat. Nos. 5,397,582, 5,292,541, 5,039,537, 4,994,297, 4,876,108, which patents are herein incorporated by reference. Products useful in accordance with the inventive method include browning liquids obtained from the pyrolysis of hardwoods such as ST-300 liquid smoke and Select 24P liquid smoke, both available from Red Arrow Products Company, Inc., as well as browning liquids obtained from the pyrolysis of sugars such as Maillose caramel coloring, also available from Red Arrow Products Company, Inc..

The optimum concentration of the commercially available products varies depending on the particular browning liquid pyrolysis product, the particular whole muscle meat product to be treated, the particular conditions for the Maillard Browning Reaction, and the desired final color. For example, Maillose without any dilution up to about 80 vol. % dilution with water can be used. The higher the concentration of the Maillose or other browning liquid pyrolysis product, the darker brown the final, whole meat muscle product will be, *i.e.*, as the concentration incenses the final color can be caused to change from a golden-brown to mahogany brown.

In some embodiments, a masking agent or flavoring enhancing composition is included with the browning liquid. If, for example, the meat product is a precooked turkey breast, from about 0.5 to about 15 wt. % turkey flavor or turkey broth or a mixture of the two can be added to the browning liquid. Honey and other flavors can also be added to the browning liquid to give a roasted aroma and enhance the flavor of the final product.

The browning liquid is applied to at least a portion of the surface of the precooked, whole muscle meat product by any suitable method, such as by dipping, brushing or spraying. The amount of browning liquid to be applied to the surface will depend on the particular combination of browning liquid, meat product, and color desired. Typically, the amount of browning liquid ranges from about 0.05 to about 1.0 wt. %, preferably from about 0.1 to about 0.8 wt. %, and more preferably from about 0.15 wt. % to about 0.3 wt. %, based

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on the weight of the precooked, whole muscle meat product. The amount will be readily determinable by one skilled in the art without undue experimentation. The surface of the meat product is then browned and crisped using an energy source that selectively heats that surface. In preferred embodiments, the whole muscle meat product is placed on a continuously moving conveyor, which passes through an energy source that creates an environment having a temperature of greater than 400° to selectively heat the treated surface. Preferred energy sources include infra red sources. The energy source selectively heats and dehydrates the surface of treated meats by creating an environment having a temperature greater than 400° C, preferably between about 425° C and about 700° C, more preferably between about 450° C and about 650° C. In those embodiments where the precooked meat product has been kept at its chilled equilibrium temperature of less than about 5°C, selective heating allows the core of the meat products to remain at a temperature no more than 6°C and preferably no more than 5°C.

The surface of the treated meat product is selectively heated and dehydrated by exposing the surface to the energy source for a short period of time, preferably for three minutes or less, and more preferably for one minute or less. In accordance with the inventive process, even at these extreme temperatures there results a crisp surface having a consistent, golden-brown to mahogany-brown color without any charring or burning on the surface, including the protruding surface portions of products precooked in netting, and without significant moisture loss. In accordance with this invention, the moisture loss will be less than 4% and in some embodiments less than 2% and even less than 1%. Consequently, by using these elevated temperatures, precooked whole muscle meat products, including meat products which are precooked in netting, are produced which have the desirable crispy golden-brown to mahogany-brown appearance, without burning or charring of their surface and without imparting an oily taste to the surface, all without significant moisture loss and with a minimum heat captured by the whole muscle meat product.

The following examples are included to illustrate the invention. They are not limitations thereon. All percentages are based on weight unless otherwise clearly indicated.

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Example 1

Approximately 2000 lbs. of boneless, skinless turkey breasts obtained from fresh young turkeys were received at 4.4°C from a producing plant. The turkey breasts were inspected and injected with 38% of a solution containing 83% water, 4.7% salt, 1.6% sodium tri-polyphosphate, 7.3% starch, 2.7% dextrose, and 0.9% flavorings. The injected turkey breasts were tumbled for 2 ½ hours under vacuum and the breasts packaged in polymeric cook-in-bags under vacuum. The average weight was 9.5 lbs. per package. The vacuum packaged turkey breasts were then cooked in an oven with 100% relative humidity for approximately 5 ½ hours. The cooking schedule was:

<u>Time</u>	<u>Dry Bulb Temperature</u>	<u>Wet Bulb Temperature</u>	<u>Relative Humidity</u>
1 hour	55°C	55°C	100
1 hour	60°C	60°C	100
1 hour	72°C	72°C	100
2 hours	79°C	79°C	100
Continued until the internal temperature reached 72°C			

The turkey breasts were showered with cold water for initial chilling and then placed in an air chilled room and chilled to 4.4. °C. After chilling, the breasts were taken out of their cook-in-bags and the gelatin purge was removed by spraying the breasts with hot water. The turkey breasts then were coated with a 30% by weight aqueous solution of Maillose. (Red Arrow Products Company, Manitowoc, Wisconsin.) The liquid pick up during coating was about 0.2% by weight based upon the uncoated meat. The coated turkey breasts were then placed on a continuous belt passing through an energy source comprised of an array of radiating metal tubes that emitted infrared energy around the product. The energy source produced temperatures of 635°C at the top of the product, 509°C at the bottom, below the belt, and 631°C on the left and right sides of the turkey breasts.

After heating for 60 seconds, the turkey breasts exhibit a desirable, consistent golden-brown color and crispy, dry surface. The product loss was less than 2% by weight and there was no charring. The temperature rise below 1" from the surface was only about 4°C.

The product was cooled to 4.4°C. The following color indices were obtained using Hunter Lab Color Meter.

Hunter Color Indices

	L*	A*	B*
Control (no treatment)	81.84	2.58	16.02
Treated surface and browned	56.78	13.30	39.16

Example - 2

Turkey breasts were injected with 38% of a solution as described in Example 1. The turkey breasts were then placed in netting and stuffed in polymeric cook-in-bags under vacuum and the packages sealed. The thus packaged turkey breasts were cooked as described in Example 1 above. After cooking, the turkey breasts were showered with cold water and further chilled to 4.4°C in blast chillers.

After chilling, the cook-in-bags were cut open and the netting removed. After removing the netting, the product surface had the desired geometrical pattern, but also had projecting or protruding edges. The gelatin purge was removed and the turkey breasts were submerged for 30 seconds in a 52% aqueous solution of Red Arrow Special Smoke #9936. (Red Arrow Products Company, Manitowoc, Wisconsin.) water

The product was placed on a continuous belt having elongated gas-fired tubes positioned equally from its top, bottom, and right and left sides. The tubes were placed

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parallel to the direction of the movement of the belt. Two turkey breasts were loaded across the width of the belt. These tubes radiated energy so that the environment around the product was 550°C at top, bottom and side of the turkey breasts.

5 The oven parameters were:

Product weight: 9.5 pounds average after removing net and cook-in bag
Product dimension: 9" long, 8" wide, 5-1/2" high
Oven belt width: 24"
Product spacing: 2 across on 12" center
10 15" distance from row to row
Belt speed: 7'/minute
Temperature set point: 550°C/550°C/550°C
 Top/bottom/side
Steam: 100. p.s.i.g..

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The product loss during browning was less than 2%. The browned turkey breasts had a very good uniform color and had no charring of the protruded edges. The Hunter Lab Color Meter reading for browned turkey breasts were:

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Hunter Color Indices

	L*	A*	B*
Treated surface and browned	50.99	10.70	33.77

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While the invention has been described in connection with its preferred embodiments, it will be understood that it is not intended to limit this invention thereto, but it is intended to cover all modifications and alternative embodiments falling within the spirit and scope of the invention as expressed in the appended claims.

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I claim:

1. A process for browning precooked, whole muscle meat products comprising:
coating a browning liquid pyrolysis product onto at least a portion of the surface of
5 whole muscle meat product; and then
exposing the coated surface to an energy source creating an environment having a
temperature greater than about 400° C for a time sufficient to selectively heat the coated
surface of the whole muscle meat product and develop a golden-brown to mahogany- brown
color on the exposed surface, without substantial shrinking the precooked, whole muscle
10 meat product.
2. The process in accordance with claim 1 wherein the precooked, whole muscle
meat product is selected from poultry, meat, and fish products.
- 15 3. The process in accordance with claim 2 wherein the precooked, whole muscle
meat product is a precooked turkey breast or a precooked chicken breast.
4. The process in accordance with claim 2 wherein the browning liquid
pyrolysis product is obtained from the pyrolysis of hardwoods or sugars.
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5. The process in accordance with claim 4 wherein the browning liquid
pyrolysis product is obtained from the pyrolysis of dextrose.
6. The process in accordance with claim 4 wherein the amount of browning
25 liquid ranges from about 0.05 to about 1.0 wt. %, based on the weight of the precooked,
whole muscle meat product.
7. The process in accordance with claim 6 wherein the amount of browning
liquid ranges from about 0.1 to about 0.8 wt. %, based on the weight of the precooked,
30 whole muscle meat product.

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8. The process in accordance with claim 2 further comprising the browning liquid pyrolysis product contains a masking agent or flavoring enhancing composition.

5 9. The process in accordance with claim 3 further comprising the browning liquid pyrolysis product contains from about 0.5 to about 15 wt. % turkey flavor or turkey broth or a mixture of the two.

10 10. The process in accordance with claim 2 wherein the energy source is an infrared radiation source.

11. The process in accordance with claim 10 wherein the energy source selectively heats the surface of the meat product by creating an environment having a temperature from about 425° C to about 700° C.

15 12. The process in accordance with claim 11 wherein the energy source selectively heats the surface of the meat product by creating an environment having a temperature from about 450° C to about 650° C.

20 13. The process in accordance with claim 1 wherein the coated surface is exposed to the energy source for one minute or less.

25 14. The process in accordance with claim 2 further comprising prior to exposing the meat product to the energy source, the temperature at the core of the meat product is less than about 5° C and immediately after browning the meat product, the temperature at the core of the meat product is less than about 8° C.

30 15. The process in accordance with claim 13 wherein prior to exposing the meat product to the energy source, the temperature at the core of the meat product is less than about 5° C and immediately after browning the meat product, the temperature at the core of the meat product is less than about 5° C.

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16. A process for browning a precooked chicken breast or a turkey breast comprising:

coating at least a portion of the surface of a chicken breast or a turkey breast with from about 0.05 to about 1.0 wt. %, based on the weight of the breast, of a browning liquid pyrolysis product obtained from hardwoods or sugars to a breast; and then

selectively heating the coated surface of the breast in an environment having a temperature greater than about 425°C with energy provided by an infra red radiation source for one minute or less.

17. The process in accordance with claim 16 wherein the precooked breast is a precooked turkey breast.

18. The process in accordance with claim 17 wherein the browning liquid pyrolysis product is obtained from the pyrolysis of dextrose.

19. The process in accordance with claim 18 wherein the amount of browning liquid ranges from about 0.15 to about 0.3 wt. %, based on the weight of the breast.

20. The process in accordance with claim 18 further comprising the browning liquid pyrolysis product contains a masking agent or flavoring enhancing composition.

21. The process in accordance with claim 20 further comprising the browning liquid pyrolysis product contains from about 0.5 to about 15 wt. % turkey flavor or turkey broth or a mixture of the two.

22. The process in accordance with claim 16 wherein the energy source selectively heats the surface of the breast by creating an environment having a temperature from about 450°C to about 650°C.

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23. The process in accordance with claim 16 further comprising prior to exposing the meat product to the energy source, the temperature at the core of the meat product is less than about 5° C and immediately after browning the meat product, the temperature at the core of the meat product is less than about 8°C.

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24. The process in accordance with claim 23 wherein prior to exposing the meat product to the energy source, the temperature at the core of the meat product is less than about 5° C and immediately after browning the meat product, the temperature at the core of the meat product is less than about 5°C.

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25. The process in accordance with claim 1 wherein the shrinkage of the precooked, whole muscle meat product is less than 4 wt. % based on the initial weight of the meat product.

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26. The process in accordance with claim 1 wherein the shrinkage of the precooked, whole muscle meat product is less than 1 wt. % based on the initial weight of the meat product.

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27. The process in accordance with claim 16 wherein the shrinkage of the precooked, whole muscle meat product is less than 1 wt. % based on the initial weight of the meat product.

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28. The process in accordance with claim 1 wherein the whole muscle meat product has protrusions on its surface caused by precooking in a net.

29. The process in accordance with claim 16 wherein the whole muscle meat product has protrusions on its surface caused by precooking in a net.

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30. A process for browning precooked, whole muscle meat products comprising:
precooking a whole muscle meat product in a netting bag;

removing the bag;

coating a browning liquid pyrolysis product onto at least a portion of the surface of
5 the precooked whole muscle meat product; and then

exposing the coated surface to an energy source and selectively heating the coated
surface of the whole muscle meat product at a temperature and for a time sufficient to
develop a golden-brown color on the exposed surface, without substantial shrinking the
precooked, whole muscle meat product.

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ABSTRACT OF THE DISCLOSURES

Disclosed is a method of producing a crisp surface and imparting a uniform golden-brown to mahogany-brown color to a precooked whole muscle meat product by coating at least a portion of the surface of the precooked whole muscle meat product with a browning liquid pyrolysis product. The coated surface is then exposed to a temperature greater than about 400° C for a time sufficient to selectively heats the coated surface of the precooked whole muscle meat product and develop a golden-brown color on the exposed surface, without substantially shrinking the precooked whole muscle meat product.

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ASSIGNMENT

WHEREAS, Prem S. Singh, of 148 Spring Avenue, Glenellyn, Illinois, 60137, Assignor, has invented a new and useful **HIGH TEMPERATURE METHOD FOR BROWNING PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS** for which an application for United States Letters Patent was filed on January 26, 2001, Application No. 09/772,100, and

WHEREAS, Assignor believes himself to be the original, first and sole inventor of the invention disclosed and claimed in the application for Letters Patent; and

WHEREAS, Swift-Eckrich, Inc., an Illinois corporation, having a place of business at 2001 Butterfield Road, Downers Grove, Illinois, 60515-1049, Assignee, desires to acquire by formal, recordable assignment the entire right, title and interest in and to the invention, the application, and any Letters Patent that might be granted for the invention in the United States and throughout the world;

NOW, THEREFORE, in consideration of the sum of Ten Dollars (\$10.00) and of other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby sells, assigns and transfers to Assignee, the entire right, title and interest in and to the invention, the application, and any Letters Patent that might be granted for the invention in the United States and throughout the world, including the right to file foreign applications directly in the name of Assignee and to claim for any such foreign applications any priority rights to which such applications are entitled under international conventions, treaties or otherwise.

Further, Assignor agrees that, upon request and without further compensation, but at no expense to Assignor, he and his legal representatives and assigns will perform all lawful acts, including the execution of papers and the giving of testimony, that might be necessary or desirable for obtaining, sustaining, reissuing or enforcing Letters Patent in the United States and throughout the world for the invention, and for perfecting, recording or maintaining the title of Assignee, its successors and assigns, to the invention, the application, and any Letters Patent granted for the invention in the United States and throughout the world.

Assignor represents and warrants that he has not granted and will not grant to others any rights inconsistent with the rights granted by this Assignment.

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Assignor authorizes and requests the Commissioner of Patents and Trademarks of the United States and of all foreign countries to issue any Letters Patent granted for the invention, whether on the application or on any subsequently filed division, continuation, continuation-in-part of reissue application, to Assignee, its successors and assigns, as the assignee of the entire interest in the invention.

IN WITNESS WHEREOF, Assignors have executed this Assignment.

Assignor:

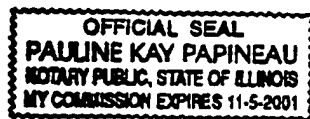
Date: 7/27/2001

Prem S Singh
Prem S. Singh

State of Illinois)
County of DePue) ss.

On July 27, 2001, Prem S. Singh, personally known to me -OR- proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.



Pauline Kay Papineau
Notary Public

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CONFIDENTIAL

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PTO-003576

DECLARATION
FOR PATENT APPLICATION

PATENT

Docket No. : 42692/KMO/C945

As a below named inventor, I hereby declare that:

My residence, mailing address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled HIGH TEMPERATURE METHOD FOR BROWNING PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS, the specification of which is attached hereto unless the following is checked:

☒ was filed on January 26, 2001 as United States Application Number or PCT International Application Number 09/772,100 and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.55, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of the foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, any foreign application for patent or inventor's certificate, or any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Application Number
Priority Claimed

CountryFiling Date (day/month/year)

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

Application NumberFiling Date

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112.

Application NumberFiling DatePatented/Pending/Abandoned

DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION

Docket No. 42892/KMO/C945

DIRECT TELEPHONE CALLS TO: Kathleen M. Oister, 626/795-9900

SFND CORRESPONDENCE TO:
CHRISTIE, PARKER & HALE, LLP
P.O. Box 7068
Pasadena, CA 91109-7068

Customer Number: 23363

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR			
Prem S. Singh		<i>Prem S Singh</i>	
Inventor's Signature			Date 7-27-2001
City Residence: Glenellyn	State Illinois	Country United States	Citizenship US
Mailing Address: 148 Spring Avenue, Glenellyn, Illinois 60137			

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United States Patent [19]
Forney et al.

[11] **Patent Number:** 5,942,142
[45] **Date of Patent:** Aug. 24, 1999

[54] **RADIANT WALL/HOT AIR IMPINGEMENT OVEN**

[75] **Inventors:** Robert B. Forney, Tiburon, Calif.;
Ernest C. Brown, Danvers, Mass.

[73] **Assignee:** Pyramid Food Processing Equip. Mfg.
Inc., Tewksbury, Mass.

[21] **Appl. No.:** 08/638,512

[22] **Filed:** Apr. 26, 1996

Related U.S. Application Data

[63] Continuation-in-part of application No. 08/356,835, Dec. 14, 1994, Pat. No. 5,512,312, which is a continuation-in-part of application No. 08/260,967, Jun. 15, 1994, abandoned.

[51] **Int. Cl.⁶** A21B 1/48; A21B 1/00;
A47J 37/00

[52] **U.S. Cl.** 219/388; 219/388; 219/401;
219/400; 99/388; 99/386; 99/443 C; 126/20;
126/21 A

[58] **Field of Search** 219/388, 399,
219/400, 401, 700; 99/386, 388, 443 C;
126/20, 20.1, 21 A; 426/243, 510, 523

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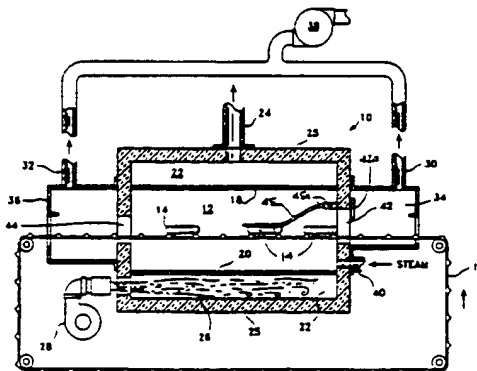
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Primary Examiner—Teresa J. Walberg
Assistant Examiner—J. Pelham
Attorney, Agent, or Firm—Thomas M. Freiburger

[57] **ABSTRACT**

An oven for cooking foods, and especially for browning foods, has heated, radiant walls. Heat may be supplied by a gas burner flame in a plenum behind the walls, with products of combustion thus being isolated from the food in the oven chamber. In one embodiment food products are continuously conveyed through the oven chamber and, depending on oven temperature, are either cooked or simply browned in the oven by the radiant wall heat. Fats and other materials rendered from the food products, if not fully incinerated in the oven chamber, may be transferred along with exhaust air from the oven chamber to a separate combustion chamber, for incineration, the heat from which is used to contribute to heat requirements for the plenum. Steam or other inert gas is introduced to the oven chamber to minimize oxidation and prevent flame, and the steam can be produced by heat exchange with exhaust plenum gases. An alternative wall heating system uses electric resistance heat elements inside a thin ceramic wall. In one preferred embodiment of a conveyORIZED oven the oven chamber has two stages, a browning stage and a cooking stage, with atmosphere gases constantly moved toward the browning stage so as to be incinerated before leaving the oven chamber. An embodiment is disclosed wherein a web-like metal conveyor of a radiant wall oven is returned through the oven in order to heat the conveyor sufficiently to put grill stripes on a product being browned, such as meat. Water spray or other means are included for controlling the temperature of the belt to a desired range. In a further embodiment a radiant wall oven is combined in series with a microwave oven, so that the food products are browned in the radiant wall oven and cooked in the microwave oven.

31 Claims, 8 Drawing Sheets



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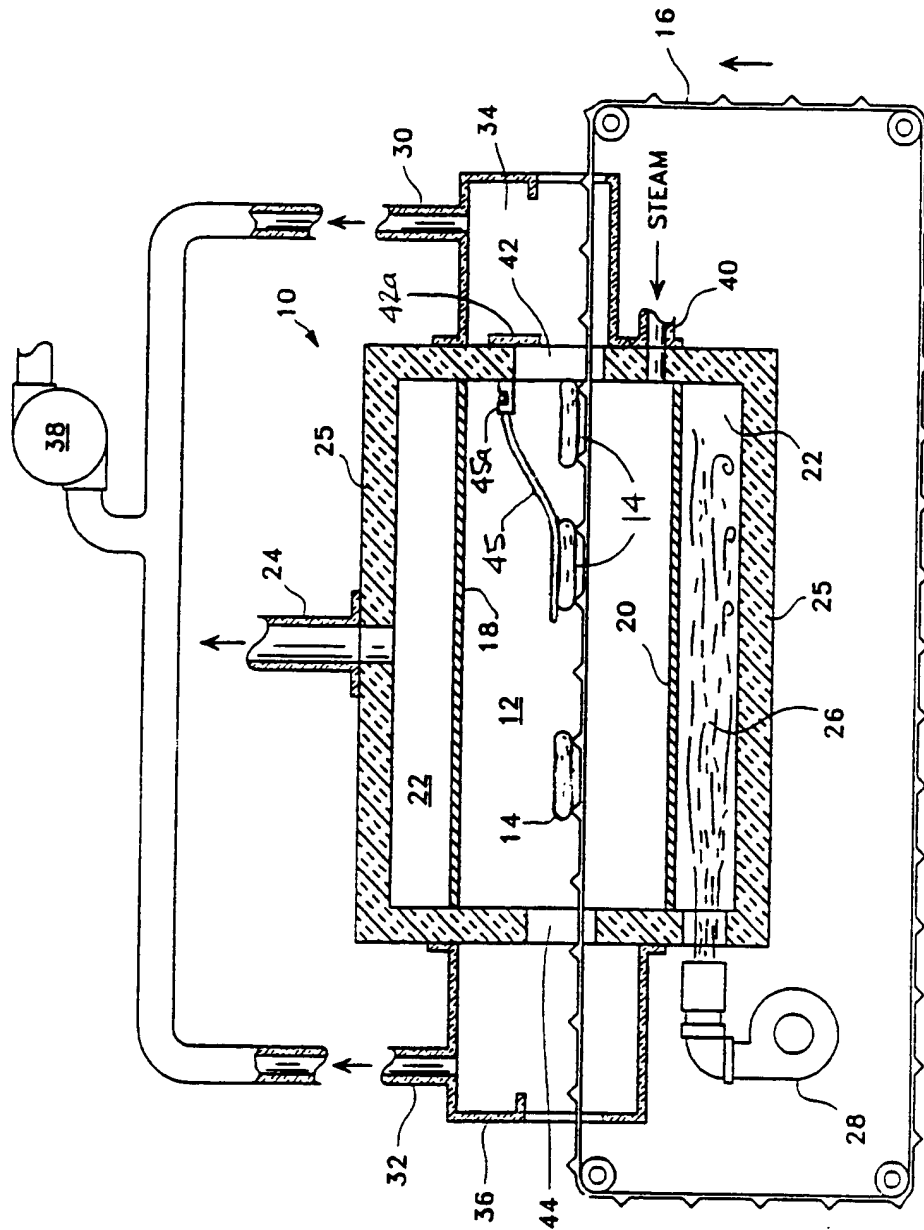
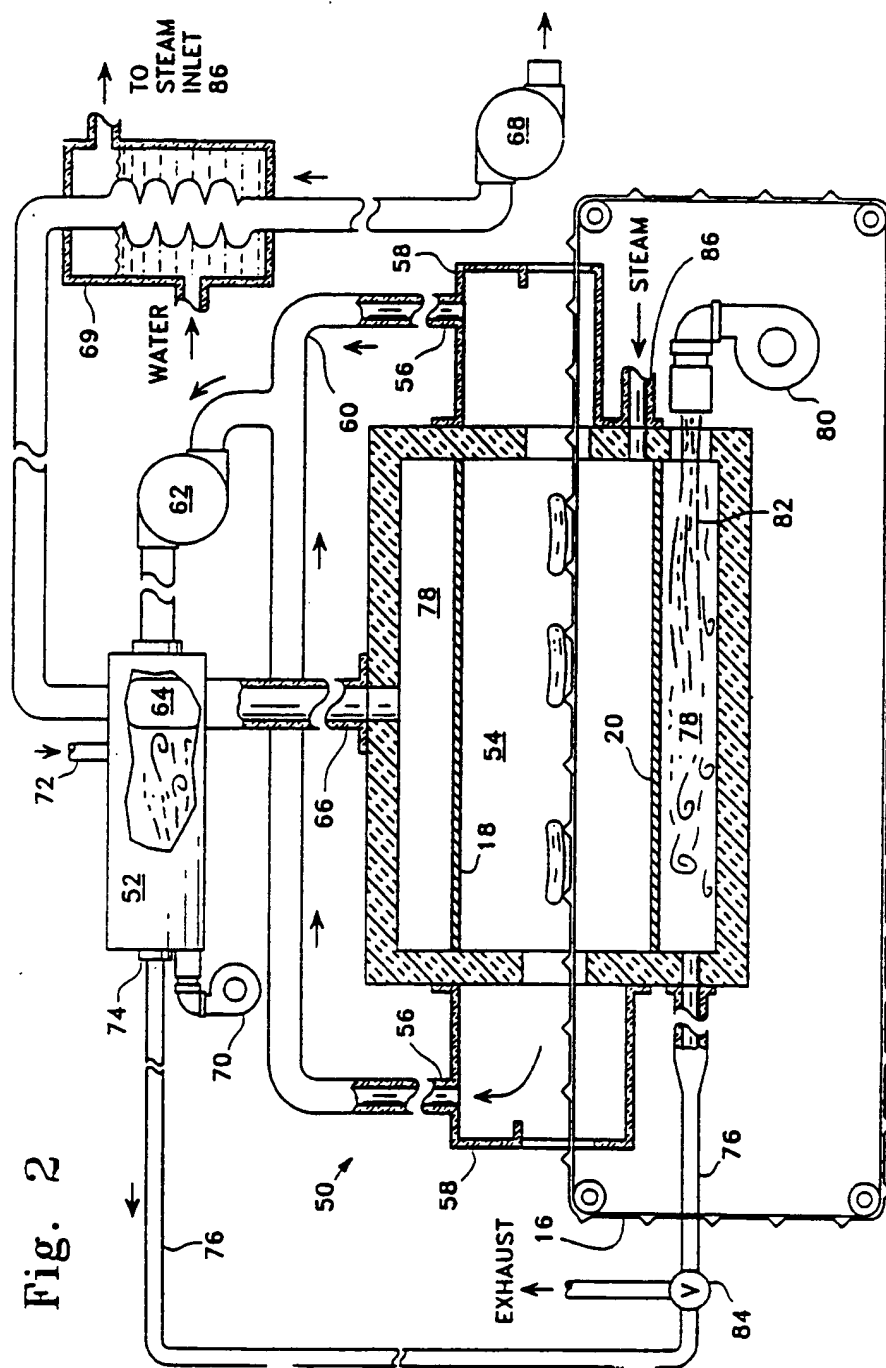


Fig. 1

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Fig. 2



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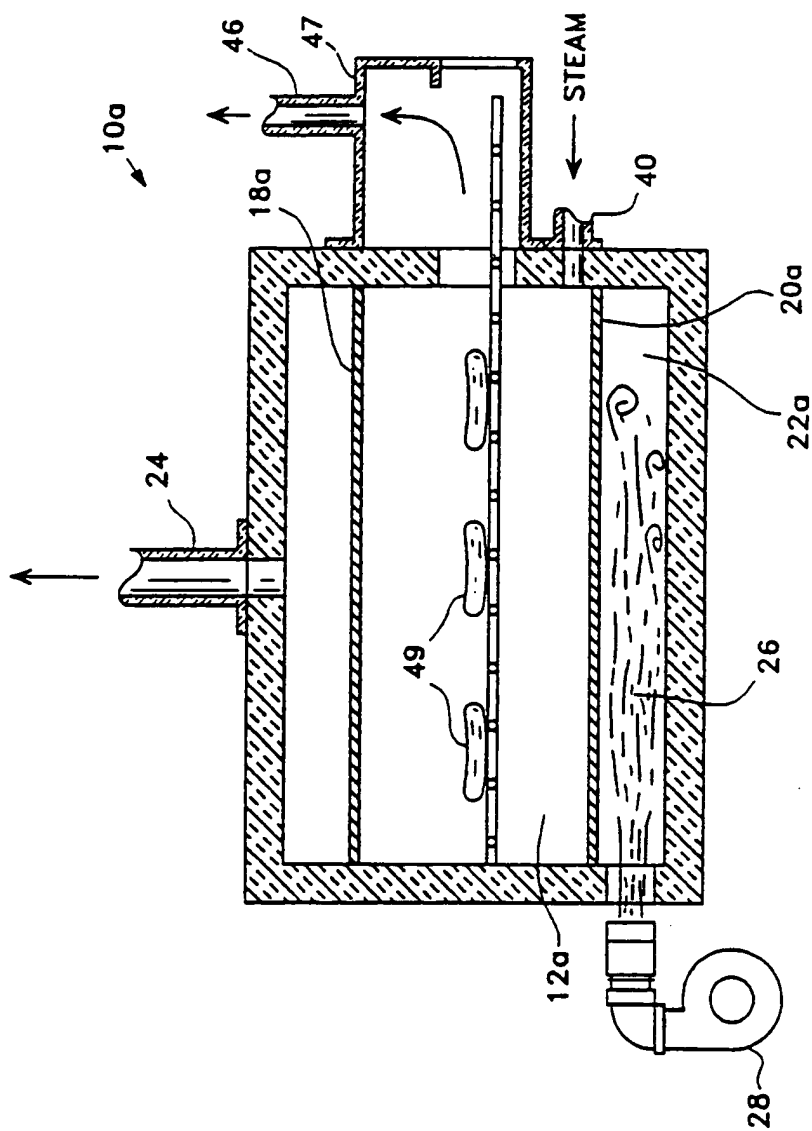
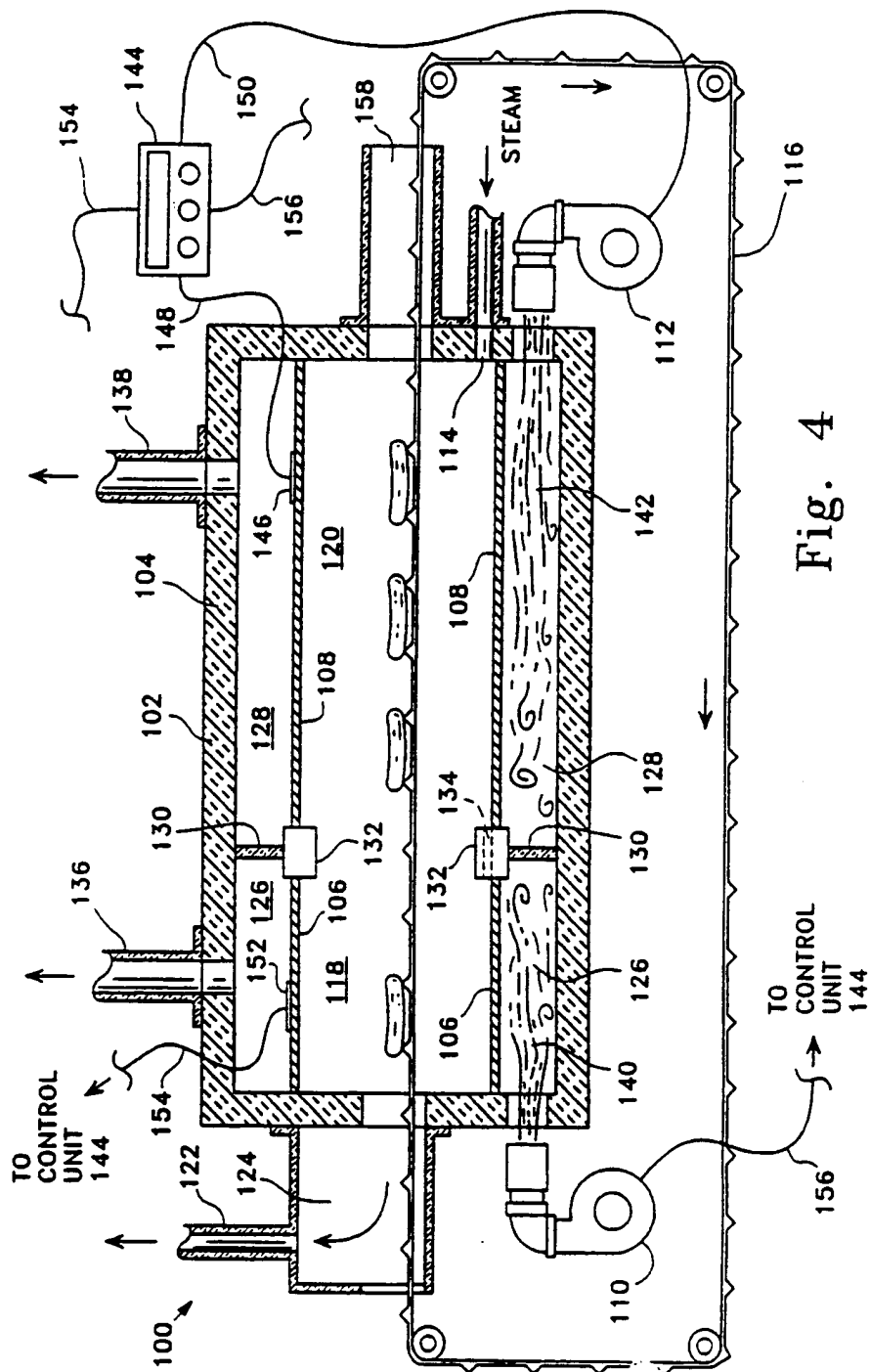


Fig. 3

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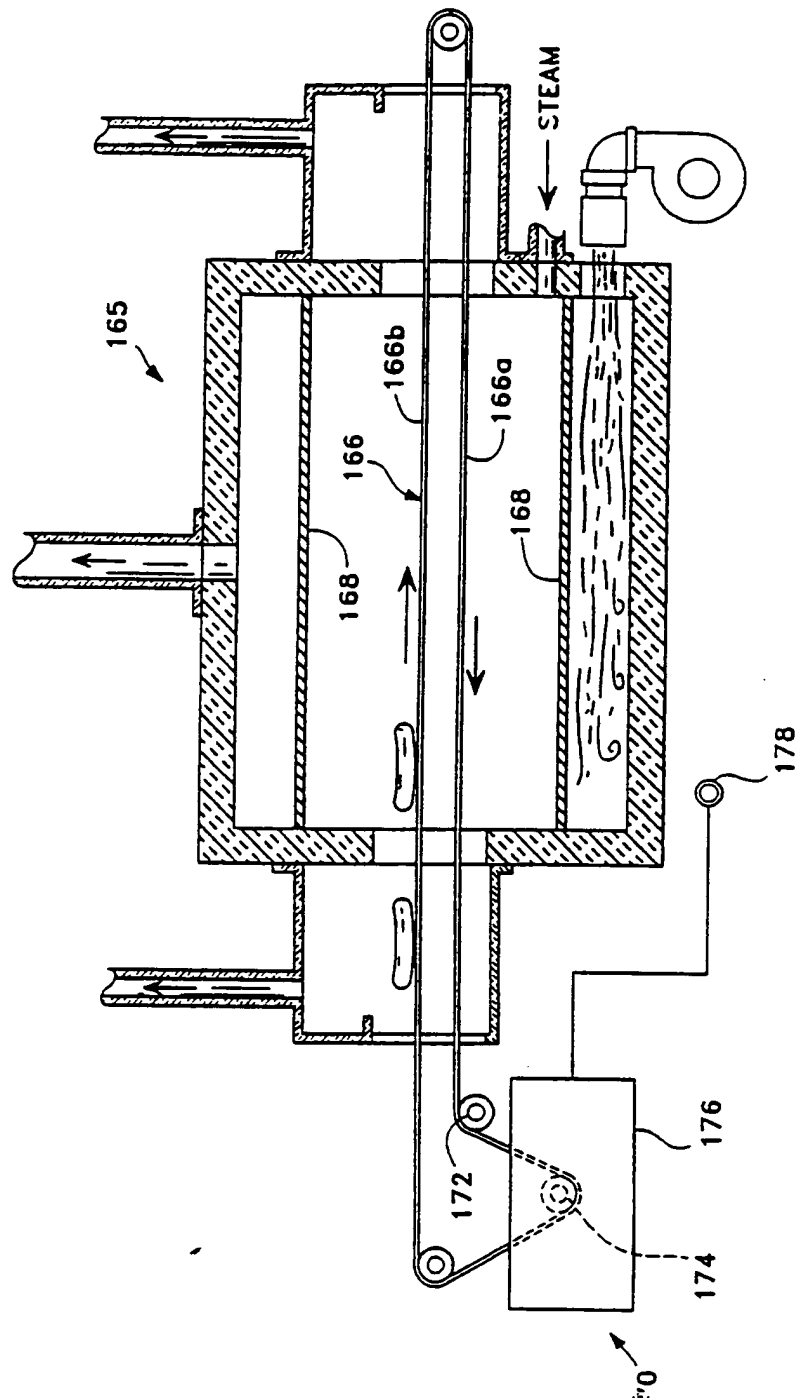


Fig. 5

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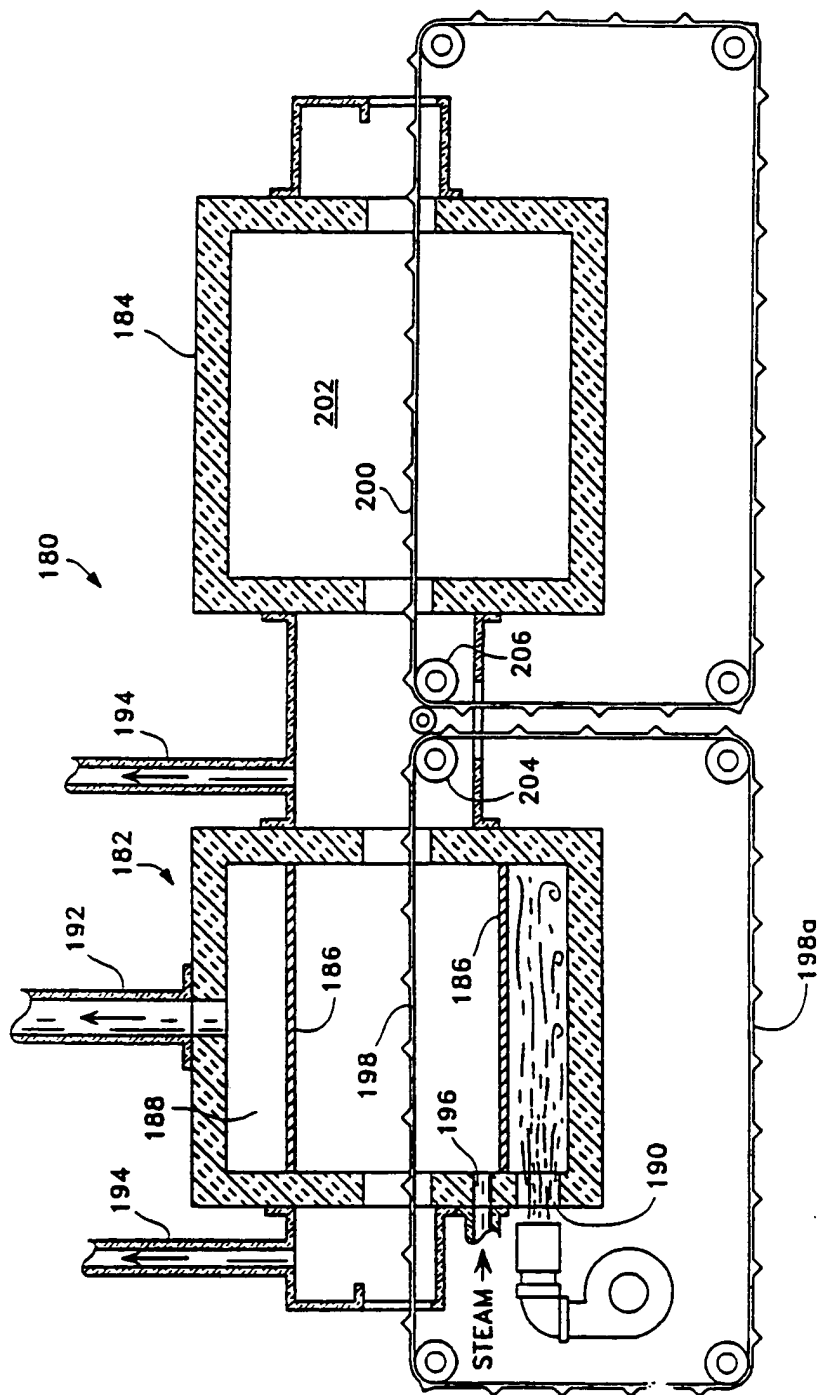


Fig. 6

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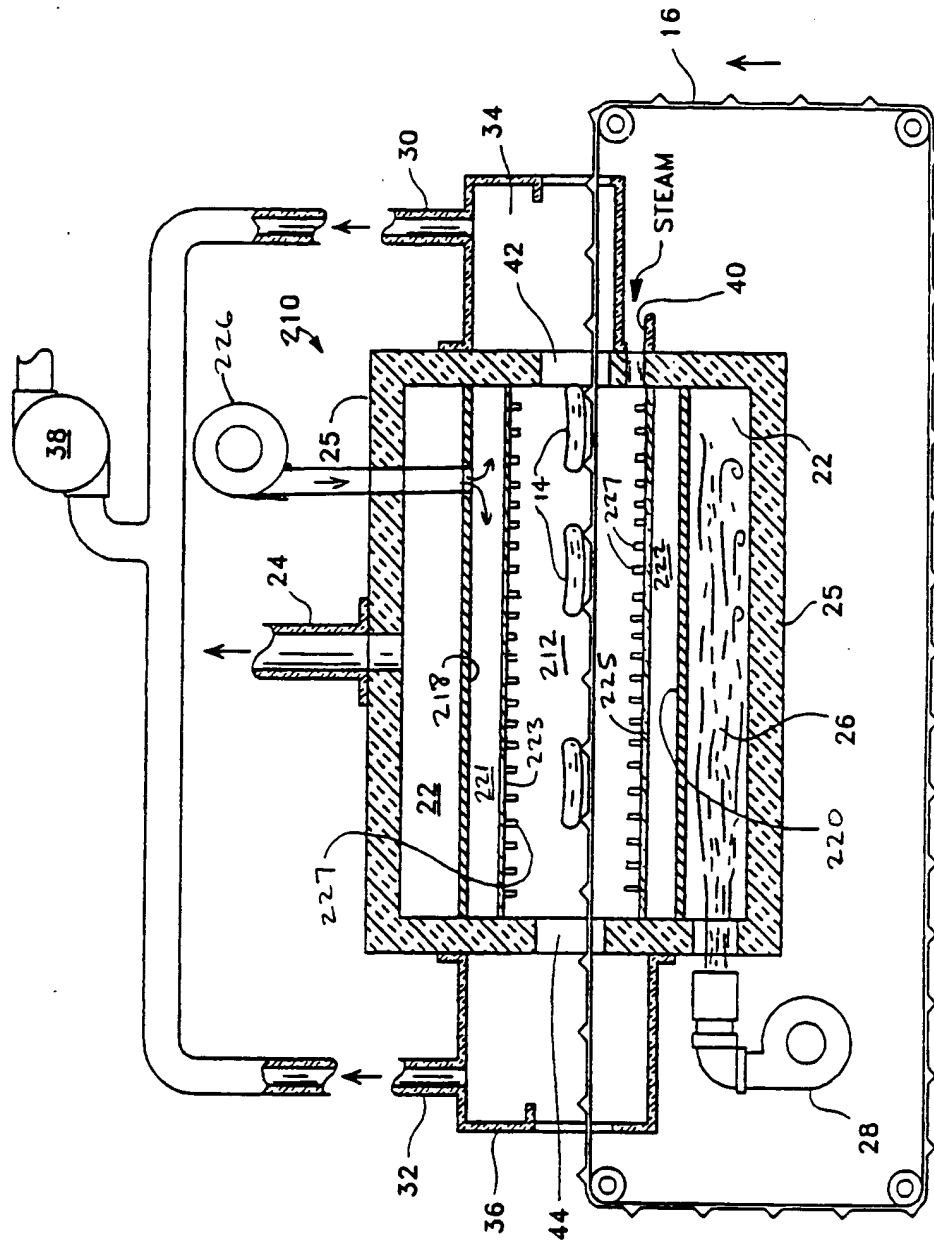
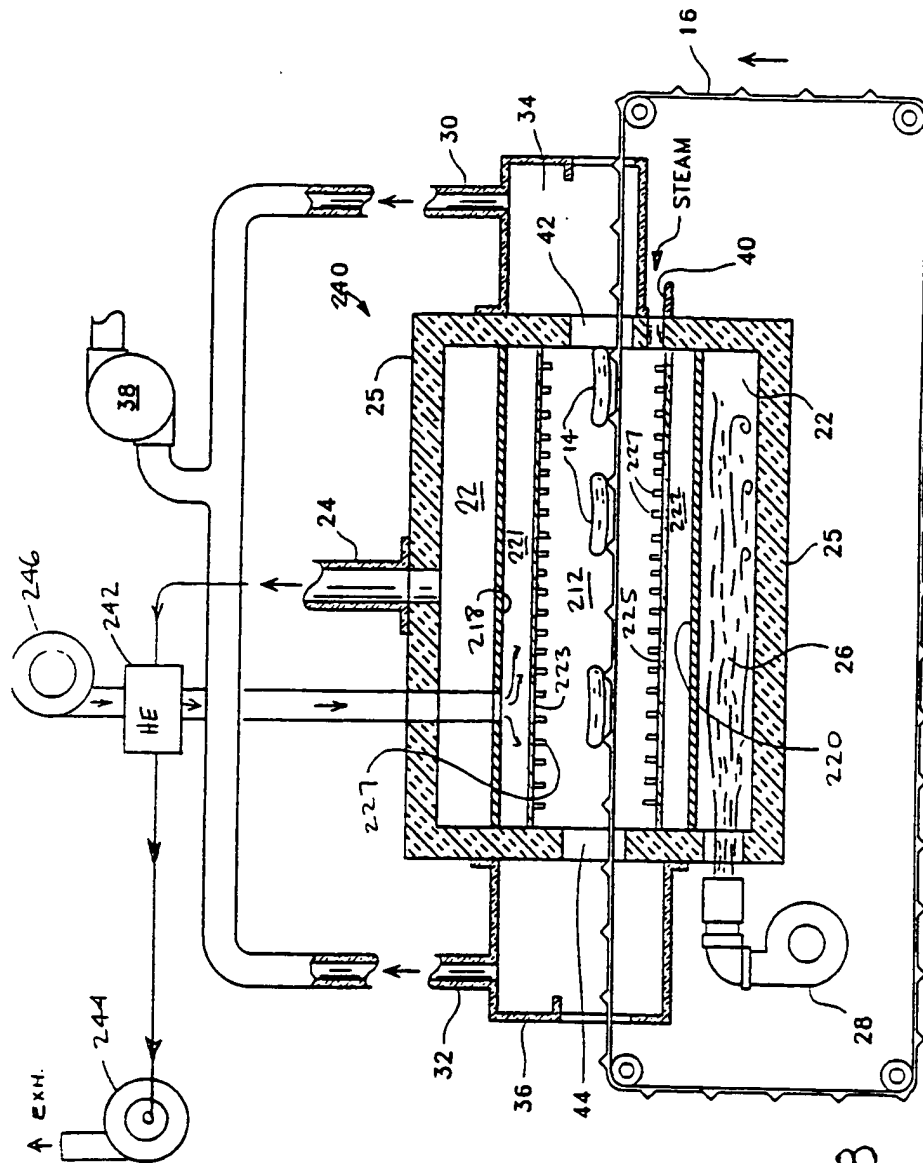


Fig. 7

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Fi. 8

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RADIANT WALL/HOT AIR IMPINGEMENT OVEN

The application is a continuation-in-part of application Ser. No. 356,835, filed Dec. 14, 1994, to issue as U.S. Pat. No. 5,512,312, which was a continuation-in-part of application Ser. No. 260,967, filed Jun. 15, 1994, now abandoned.

BACKGROUND OF THE INVENTION

This invention is in the field of cooking of foods, and more specifically the invention is concerned with browning and cooking of foods in such a way as to avoid the exhausting to the atmosphere of objectionable smoke and gases from rendered fats and other products, and in a fast and efficient manner which greatly reduces space requirements as well as cleaning requirements. The invention is also concerned with reclaiming of heat from various processes including both cooking and incineration of rendered fats and oils, for use in other processes associated with the system.

Cooking systems, including commercial ovens, often have a problem with exhausting of gases and smoke particles from rendered fats, oils and other materials emanating from the cooked food product. Environmental regulations have required scrubbers or smoke afterburners associated with exhaust stacks, to make the gases and remaining particles suitable for introduction to the atmosphere.

Radiant heat in ovens is well known and has been used both commercially and in home ovens. Calrod and gas infra-red heaters are often used as cooking elements.

A cooking and browning system is described in Forney U.S. Pat. No. 4,737,373. High temperature, high velocity air is used in an oven to brown a meat, poultry or other food product; separately, before or after the browning step, the food product is cooked at a lower temperature and more slowly, such as in a steam oven on a continuous flow basis. Steam for the slow cook is generated by using exhausted hot air from the browning oven as a source of heat.

Various types of cooking and/or browning ovens are shown in the following U.S. Pat. Nos.: Hoffman et al. 2,529,253, Szabrak et al. 3,721,178, Fagerstrom et al. 3,908,533, Brown 4,023,007, Baker et al. 4,121,509, Lang-Ree et al. 4,254,697, Williams 4,383,823, Wells 4,448,117, Wells et al. 4,473,004, Wiggins et al. 4,569,658, Henke 4,591,333, Hwang et al. 4,834,063, Wells et al. 4,884,552, Baker 4,936,286 and Smith 4,876,426.

Of the above patents, Wells U.S. Pat. No. 4,473,004 discloses a tunnel-type oven which utilizes radiant heat generated from combustion of gas circulated in a closed cylindrical chamber surrounding a food product conveyor, so as to cook products as they advance on the conveyor through the tunnel oven (see particularly FIG. 16). This patent mentions the use of wall temperatures in the range of 1000° to 1200° F. or higher. Because of this high temperature, the patent states that the disclosed ovens can be self-cleaning, with rendered grease droppings, food residue and other food material reduced to ash. The patent also suggests the desirability of avoiding direct flame contact with food products, to prevent the generation of carcinogens.

Wells U.S. Pat. No. 4,884,552 discloses another form of gas-fired tunnel oven.

The Wiggings patent describes a tunnel oven of the convective type in which off gases from cooking are directed through a heat exchanger for heat exchange with ambient air before being circulated into the oven, and the patent mentions an increase in efficiency of the oven due to this heat exchange.

A problem with many commercial ovens, and even domestic cooking facilities, is the direct exposure of products of combustion to the food product being cooked, whether the food contact is by a direct open flame (recognized by Wells to be undesirable) or by gases produced by combustion. This can introduce carcinogens and other undesirable substances into food for human consumption.

None of the above patents has disclosed an oven for cooking and/or browning with the advantages of low emissions and efficiently controlled cooking, in an oxygen-deficient oven atmosphere as in the invention described below.

SUMMARY OF THE INVENTION

In accordance with this invention, an oven has radiant walls behind which is a plenum or plenum within which heating of the walls occurs. The walls may in this way be heated to a high temperature, e.g. about 1200° to 1500° F., for surface browning of meats, poultry, fish, etc. At this high wall temperature (one preferred operating wall temperature is about 1450° F.), and with a low-oxygen atmosphere in the oven, it is found that rendered fats and oils are "incinerated" (reduced to ash) without flame, to the point that the oven exhaust is very clean and generally will not need further treatment. The term "incineration" as used herein is intended to mean vaporization or consumption of such rendered materials, without air in the oven but preferably with air in a separate combustion chamber, if used. The radiant walls could be above and below the food product, left and right of the food product, or both, but in a preferred embodiment the wall is continuous in transverse cross section, being cylindrical, i.e. circular/cylindrical or elliptical/cylindrical.

It is found that the exhaust from the oven is at a fairly low temperature, lower than the wall temperature. The cooking is radiant and not convective, thus the atmosphere is not heated to a temperature the same as that of the walls.

Inert gases other than steam can be used in the oven chamber if desired.

In a simple, static form of the oven it can include an openable door, for batch cooking/browning of foods; in a commercial embodiment the oven can include a conveyor continuously moving food products through the oven chamber.

Thus, it is an important feature of the invention that the products of combustion are not exposed to the food in the oven chamber. This enables the use of various fuels, including "dirtier" fuels as regards substances dangerous for human consumption, since these fuels and their products of combustion are always isolated by the oven walls from the food products being cooked or browned. In addition to natural gas, other fuels such as oil, butane, diesel fuel, kerosene, gasoline or other petroleum-based fuels may be used, as well as solid fuels such as pulverized wood and coal.

In an alternative embodiment, a radiant wall oven comprises a ceramic shell with embedded electric resistance elements, insulated around the outside, avoiding the need for a plenum.

The radiant wall oven of the invention, in this same form or in another form, can be used at a lower wall temperature to cook products more thoroughly and more slowly. At approximately 300° to 800° as a wall temperature the oven will cook products over a longer period (depending on makeup, shape and weight of the product), and this may be accomplished commercially using a conveyor continuously

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moving through the oven chamber. In this case, meats, poultry and other fatty products will give off rendered fats and oils into the oven atmosphere, and again the low-oxygen atmosphere in the oven chamber prevents these rendered products from flaming in the oven. However, these rendered products enter the oven atmosphere (not incinerated at this range of temperature) and as exhausted out of the oven normally cannot be introduced directly into the atmosphere. An afterburning or incineration of these products is required. Therefore, in an embodiment of the invention an incinerating combustion chamber is provided separate from the oven chamber.

Exhaust gases, rendered fats and oils, etc. from the oven atmosphere of the full cooking oven are continually withdrawn (as by hoods at the entry and exit to the oven chamber) and are directed into the combustion chamber. En route to the combustion chamber these gases, oils and smoky products preferably are preheated, using exhaust heat from the oven heating plenum (behind the walls) in heat exchange with the oven atmosphere gases. The plenum exhaust temperature will be slightly lower than the oven wall temperature (depending on efficiency of heat transfer to the walls), but will be sufficient to appreciably elevate the temperature of the oven gas and smoke products. The plenum preferably is exhausted as slowly as possible, just sufficient to maintain gas combustion in the plenum by introduction of new makeup air.

In the incinerator or combustion chamber is a burner which fully combusts these cooking products with air introduced. Incineration temperature should generally be above 1200° F., more preferably at about 1400° to 1500° F. The hot gases resulting from this incineration can then be introduced back to the plenum or plenum which are directly behind the walls of the oven chamber as primary heat for the plenum. These gases entering the heat plenum will still be very high, typically above 1400° F., and will supply much heat to the radiant walls of the oven, often sufficient to operate the oven. The flow volume of these hot gases through the plenum can be varied as needed, and can be reduced at times they would tend to overheat the walls beyond the desired wall temperature. However, additional heat from a gas flame may be required to maintain the desired temperature, and may be activated intermittently, and thus the plenum is often referred to herein as a combustion plenum.

From the combustion plenum, gases can be exhausted to the atmosphere, and as noted above, they are preferably first used through heat exchange to preheat the oven exhaust gases and smoke prior to incineration. In addition they may be used to generate steam for introduction to the oven to create a low-oxygen or no-oxygen atmosphere. The heat from the plenum exhaust could also be used in exchange with makeup air for the plenum, to preheat that air.

With the oven used at lower, full-cook temperatures as described, the oven chamber will become dirty. However, the gas burner or burners in the plenum are available to heat the oven to high temperature (1200° to 1500° F.) for self cleaning periodically, as needed.

It is assumed herein that the term "cooking" includes full cooking as well as merely browning an outer layer of a food product, even though the terms "cooking" and "browning" are often used together or in the alternative. Browning is a form of cooking.

In one preferred embodiment the oven includes an additional plenum, formed by an additional wall inward in the oven from the hot, radiant wall described above. The additional wall has a series of nozzles for high temperature air

impingement on the food products, to enhance browning or cooking and shorten the dwell time required. The wall with the nozzles acts as a radiant wall which browns or cooks the product along with the air impingement, while the outer wall heats the impingement air and the radiant wall adjacent to the oven chamber. Introduction of steam or other inert gas is at a rate which will prevent flaming in the oven. Typically a greater flow through of steam will be required where hot air impingement cooking is included along with the radiant wall cooking.

Summarizing one form of the present invention, a method for cooking a food product includes placing the food product in an oven chamber having heated, radiant walls, with the food product spaced from the walls. The radiant walls are maintained at a high temperature which may be between about 1400° F. and 1500° F., and the radiant walls also include a series of nozzles for delivering high temperature, high velocity air against the food products. The method includes retaining the food product in the oven chamber, subjected to the heat from the radiant walls and from the hot air impingement, for a dwell time sufficient to brown the surfaces of the food product but not to burn the surfaces. An oxygen-deficient atmosphere is introduced into and maintained in the oven chamber, sufficiently low in oxygen that the food product does not flame while in the oven chamber even in the presence of the air from air impingement.

The food product generally will be surface-browned only using this high temperature procedure, and will have a dwell time in the oven which is short, for example about 30 seconds. Full cooking will be achieved by a separate process. However, if the food product is sufficiently thin, such as very thin hamburger patties, for example, they can be cooked sufficiently for consumption, as well as browned, during this high temperature dwell.

In one embodiment a grill striping device comprising metal rods is included in the oven chamber. A plurality of these rods, heated by the heat in the oven (radiant, with or without hot air impingement), ride over the tops of food products moving through the oven.

A cooking stage, used in combination with the radiant wall oven of the invention, can comprise conventional convection cooking, steam cooking, cooking in accordance with Forney U.S. Pat. No. 4,737,373 or other types of conventional cooking. In accordance with one preferred embodiment of the invention, the cooking step is accomplished in a microwave oven. This has the advantage of greatly reduced floor space and cleaning and sanitation costs, and it cooperates with the radiant wall oven of the invention in that both processes create little or no smoky exhaust. Browning is preferably, but not necessarily, accomplished first. The combination of radiant wall browning and microwave cooking has the advantages of (1) very good control of cooking and browning, (2) very fast cooking/browning, (3) very low space requirements, (4) excellent cleaning characteristics of both ovens, almost eliminating cleaning labor, down time and chemicals, and (5) virtually no smoky exhaust from either process, avoiding the need for exhaust scrubbers even in densely populated areas.

In one embodiment of the invention a commercial, conveyorized oven has two stages: a browning stage and a full cooking stage, along a single conveyor path. Rendered materials, smoke and gases from the cooking area can be drawn through the browning oven to be incinerated prior to exhausting.

The invention also encompasses the radiant wall oven itself, which includes a housing defining the oven chamber

with walls, at least one wall having behind it a hot air plenum (for supply to the nozzles) and a hot gas chamber or plenum behind the hot air plenum. The hot gas chamber heats a wall and imparts radiant energy into the hot air oven chamber. Preferably the oven wall is continuous peripherally around the oven chamber, and may be shaped as a cylinder or generally as a rectangle, and preferably with hot air nozzles both above and below the food products. A flame retardant means is included for introducing an oxygen-starved atmosphere into the oven chamber, preventing flaming of food products when cooked and/or browned in the oven chamber. Exhaust means are included for continuously withdrawing oven gases from the oven chamber during cooking of food products. Separate exhaust is also provided from the hot gas chamber.

It is therefore among the purposes and objects of the invention to provide an oven which will cook and/or brown a food product by radiant heat energy emanating from the walls of the oven, preferably with hot air impingement also supplying heat to the food product. The oven chamber is isolated from any products of combustion which provide the heat. A related object is to provide a clean exhaust from the cooking process, by complete incineration of cooking by-products within the oven itself or via a separate after-burner or combustion chamber, with conservation of heat energy by preheating oven gases before incineration and preferably using some of the combustion heat to generate steam for the reduction atmosphere. The radiant wall/air impingement oven in connection with an adjacent microwave oven has the advantage of greatly reduced space requirements, fast, ideal cooking and browning, and avoidance of chemical oven cleaning and objectionable exhaust gases. These and other objects, advantages and features of the invention will be apparent from the following description of a preferred embodiment, considered along with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view representing a radiant wall oven in elevational cross section in accordance with the invention.

FIG. 2 is a schematic representation similar to FIG. 1 but showing another embodiment of the invention, wherein an external combustion chamber is connected to the radiant wall oven.

FIG. 3 is a view showing a modified embodiment of the oven of FIG. 1.

FIG. 4 is another schematic diagram showing an oven of the invention, in this case being a combined high-temperature and lower temperature oven.

FIG. 5 is a schematic side elevation view showing a radiant wall oven of the invention, similar to some of the embodiments described above but with a conveyor which returns through the oven.

FIG. 6 is another schematic view, showing a compound oven arrangement which includes a radiant wall oven and a microwave oven, for browning and cooking food products in succession.

FIG. 7 shows in schematic elevational cross section an oven similar in some respects to the oven of FIG. 1, but including an additional internal wall defining a hot air plenum for delivering hot air against the food items to be browned or cooked.

FIG. 8 is a view showing the oven of FIG. 7, but with the cooking hot air pre-heated with a heat exchanger which withdraws heat from the exhaust of the hot gases used to heat the oven.

DESCRIPTION OF PREFERRED EMBODIMENTS

In the drawings, FIG. 1 shows schematically a radiant wall oven 10 having an internal oven chamber 12 for cooking and/or browning of food products 14 inside the chamber (the term "cooking" includes browning). In the embodiment illustrated, a conveyor 16 is shown for continuously moving food products through the oven. However, it should be understood that in a simpler form of the invention the oven can be a static oven, wherein foods are cooked in a batch procedure, i.e. loaded into the oven and removed after a cooking/browning cycle, as shown in the modified embodiment of FIG. 3.

In the embodiment illustrated in FIG. 1, the oven chamber 14 has radiant walls shown at 18 and 20 above and below the food products. These radiant walls, which are heated to a high temperature, can comprise upper and lower separate walls (preferably arch-shaped around the path of the conveyor), but in a preferred embodiment they comprise one continuous wall extending peripherally around and defining the boundaries of the oven chamber 12. The chamber wall may be circular-cylindrical or elliptical-cylindrical (long dimension horizontal), for example. The oven chamber wall may be formed of stainless steel or other special metal alloy having high-temperature (e.g. 1700°-1800° F.) capability. These walls 18 and 20 are heated via a heat plenum 22 shown above and below the walls, preferably comprising a single plenum surrounding the chamber wall 18, 20, exhausted as indicated at 24 in the drawing, i.e. a plenum exhaust at the top of the unit. Insulation 25 is indicated as surrounding the plenum 22, and this may be similar to insulation described below.

The heat plenum 22 is heated by combustion of gas producing a flame 26 from a burner 28 as shown. As noted earlier, the oven chamber of the invention most preferably is of a cylindrical internal shape, or an elliptical shape, flatter at top and bottom. In this way, the radiant surfaces completely surround the food product being cooked or browned. It has been found that a single gas burner in the plenum, with the flame positioned below the cylindrical oven wall (which may be stainless steel or other high-temperature metal alloy), will have the effect of spreading the flame and hot gases up around the circular or elliptical cylinder defining the oven chamber, so that the entire cylindrical wall is quickly heated to a glowing state. The spreading of this heat in the chamber wall is assisted by cross-radiation in the oven chamber and by conduction through the metal, as well as by the natural path of the flame and hot gases up around the exterior of the cylinder toward upper vent 24. In a longer oven more than one gas burner 28 may be needed, positioned below the wall cylinder in the plenum and spaced along the length of the plenum. A single burner of about 50,000 BTU capacity has been found adequate for the purposes described herein in an oven chamber of the type generally shown in FIG. 1, with the oven chamber being about 2½ feet in length and about 15 inches in internal diameter.

For best efficiency in directing the flame and hot gases to spread the heat as desired around the oven chamber wall, the insulating blanket 25 surrounding the plenum preferably also has a cylindrical shape, leaving a generally toroidal space surrounding the oven chamber, as the plenum. This insulation may be fire brick, ceramic insulation such as "Fiberfrax" (trademark) or other high temperature insulation which can stand temperatures at least as high as about 1700° to 1800° F., preferably up to about 2000° F. or more.

The diagram of FIG. 1 also shows vents 30 and 32 positioned to draw off gases, as well as any smoke present, from the oven chamber on a continuous basis. Each vent 30, 32 has a hood or vestibule 34, 36 for collection of gases with negative pressure, i.e. a fan or suction unit 38 is connected to these vents, preferably a common fan unit for both vents as schematically indicated.

The diagram also indicates steam being injected at 40 into the oven chamber. The introduction of steam is an important feature of the process and system of the invention, since the steam establishes an oxygen-starved atmosphere, with little or no oxygen to support any combustion within the chamber 12. Therefore, even with the radiant walls 18 and 20 operated in a preferred temperature range of about 1000° to 1500° F., more preferably about 1450° F., no flaming of rendered oils, fats or dropped crumbs or food particles will occur in the oven chamber. The steam is preferably introduced in such a way, and is so related to the withdrawal draft from the vents 30 and 32, as to establish a very slightly positive pressure within the oven chamber. Thus, steam and exhaust gases are always being pushed out of the oven chamber, without the opportunity for air in any significant quantity to enter through the two oven openings (entrance and exit) 42 and 44.

Thus, in the illustrated embodiment of the invention, any rendered fats, oils or other particles which would be considered pollutants and should not be exhausted to atmosphere are essentially "incinerated" within the oven chamber. The oven chamber can be vented directly to the outside atmosphere. Generally a strong reddish glow is observable in the area immediately surrounding the food products, particularly those containing fats and oils, but no open flame is observed. Were it not for the low-oxygen atmosphere in the oven chamber, there would be high-temperature combustion of rendered materials from food products, and the surfaces of the products would be badly burned.

The oven shown in FIG. 1, as well as the static oven described as an alternative, operate at the high temperatures referenced above. This is the temperature of the radiant walls, needed to effectively brown the exterior surfaces of the food products in a very short time (e.g. about 20 to 35 seconds) and to incinerate by-products of cooking. For certain food products, such as very thin meat patties as noted above, a full cook can sometimes be accomplished using this oven at the prescribed temperature. However, most foods, particularly most meats or poultry or other foods containing fats and oils, will typically be cooked at a lower temperature such as in a conventional oven or an oven of the type described, for example, in Forney U.S. Pat. No. 4,737,373.

FIG. 1 also shows a grill striping rod 45, one of a series which will ride on the top surface of the food products 14 as they pass through the oven chamber. The movement of the food products relative to the grill rods 45 prevents sticking of the product to the rods. The length and weight of the rods, their diameter and the spacing between them can be chosen as desired depending on the depth and intensity of the brand marks to be made. As an example, the spacing between the rods, i.e. the unbranded space, may be about one-half inch. The rods themselves may be about one-fourth inch to one-half inch in diameter. In preferred embodiments these rods are heated by the radiant wall heat. The longer the rod, or the greater its mass, the more the rod will retain heat while giving up some of its heat to the food products. In other words, the drop in temperature of the rod during branding will be less if the rod is of greater mass.

As indicated schematically in FIG. 1, the series of rods 45 may be supported at their upper ends in brackets 45a,

loosely held therein and in a way to permit pivoting of the rods while maintaining the rods parallel to the conveyor travel direction. If a different style of branding or no branding is desired, these rods may simply be replaced with different rods or removed. Access to the rods is via the opening 42, the vestibule 34 preferably being removable. The oven opening 42 (as well as the exit 44) can have a shutter-type door 42a as schematically shown in FIG. 1, adjustable up or down depending on the size of the food products 14 to be browned or cooked, and this shutter door can be raised to a fully open position for access to the rods 45. The grill striping rods 45 preferably are mounted for pivoting individually, rather than as a unitary "fork" configuration, since this will allow the individual rods to follow the contours of the food product, which may be irregular as in the case of chicken, etc.

If desired, a counterweight arrangement can be provided for the grill striping rods 45. Such a counterweight arrangement can include a portion extending out of the oven chamber from each branding rod 45, with adjustable-position counterweights (not shown) accessible from the vestibule 34.

It should be understood that the grill striping or branding rods 45 shown in FIG. 1 can be included in any of the conveyorized ovens disclosed herein, including the ovens of FIGS. 2, 4, 6, 7 and 8; this branding system generally comprises an alternative to the system shown in FIG. 5 and has the advantage of versatility in that the branding rods can be installed or removed from the cooking chamber depending on application requirements. Also, as noted above, different styles and degrees of grill striping can be achieved by changing the diameter, spacing and weight of the rods.

The oven 10 does not produce an extremely hot exhaust at the venting vestibules 34 and 36. Even though the walls preferably are at about 1450° F. in the high-temperature use of the oven, the exhausted gases from the oven cooking chamber are cooler. Also, as noted above, the plenum exhaust temperature is slightly lower than the wall temperature—this exhaust temperature depends on efficiency of heat transfer to the wall, but is slightly lower than the radiant wall temperature.

Again, a unit of the type generally shown in FIG. 1 can comprise a closed oven chamber, with a door for loading of food products and later removal of the cooked or browned products. The chamber will still be vented to the atmosphere and the oven atmosphere will again be an oxygen-deficient atmosphere, preferably with steam introduced during a cooking/browning cycle.

Such a simplified, static cooking oven, shown schematically at 10a in FIG. 3, can be used for domestic purposes, and could replace, for example, a backyard barbecue if operated at two stages of temperature. FIG. 3 shows the oven 10a as having an oven chamber 12a, which is shaped similarly to the chamber described relative to other embodiments, i.e. preferably a cylindrical oven wall 18a providing a surrounding radiant wall and defining the oven chamber. The gas burner 28 directs a flame 26 into the plenum 22a, preferably at the bottom of the plenum as indicated, so that the hot gases from the flame surround the radiant wall 18a within the plenum, the gases being exhausted from the plenum at a vent 24. Steam is injected at 40, into the oven chamber, in the manner described previously. In this form of the oven the steam and other oven gases are exhausted at a stack 46, via an opening vestibule or hood 47. A lower flow rate of steam injection into the oven normally will be required in this embodiment, since the

oven is not open at both ends as in a conveyORIZED oven. The steam injection maintains a slightly positive pressure in the oven, substantially preventing air from entering at the vestibule 47. Some air may enter, but such air is not sufficient to support flaming in the oven.

The oven 10a can be operated at different temperatures. For browning, at about 1450° F., the radiant wall 12a will brown the food products 49 within the oven while also incinerating fats, oils, etc. rendered from the products. At a lower temperature, e.g. about 300° to 800° F., the products 49 can be fully cooked. In this case the renderings from the food products will not be incinerated but still will not flame because of the oxygen-deficient atmosphere from the steam injection. The oven wall will become dirty from the smoke, oil and particles, but will be "self-cleaned" each time the oven 10a is used at the higher temperature (e.g. about 1450° F.), with or without steam introduced; without steam, combustion of these materials will occur. Steam can be generated using exhausted heat from the plenum 12a.

FIG. 2 shows a similar radiant wall oven 50 according to the invention, but in this case having connected to it a separate combustion chamber or incinerator 52 which completely burns rendered fats, oils, crumbs and other particles withdrawn from the oven chamber 54. As shown in the drawing, a pair of vents 56 with hoods 58 at the inlet and outlet of the oven chamber 54 withdraw oven atmosphere continually and feed the withdrawn gases and particles through a line indicated at 60, via a blower or fan 62, to a preheat exchanger 64 connected to the incinerating combustion chamber 52. Here the withdrawn oven atmosphere, which has a relatively low temperature (depending on the operating temperature of the oven's radiant walls 18 and 20), is preheated in the heat exchanger 64 by exchange with exhausted plenum gases withdrawn through a vent or stack 66 by a fan 68. This utilizes much of the heat from the higher-temperature plenum gases, so that the preheated oven gases are closer to combustion temperature when they enter the incinerator 52. Excess heat can be used to generate steam using a heat exchanger 69. A burner 70 in the combustion chamber 52 ignites the oven gases, with rendered oils, fats and other combustible particles at a temperature of about 1400° to 1500° F., at which they are completely incinerated and turned to ash. The combustible oils, fats and other particles can serve as part of the fuel in the burning process, which is supported by air introduced into the incinerator at 72.

The resulting gases then exit the incinerator at 74, and as indicated by the conduit line 76, are introduced into the plenum 78 of the oven 50. These high temperature gases thus help supply heat to the walls 18 and 20 in the plenum, to heat the walls to the desired temperature. One or more burners 80 are also included to direct a flame 82 into the plenum to heat the back sides of the radiant walls 18 and 20, but these burners are not always needed if a relatively low temperature cooking is taking place within the oven chamber 54. Also, the flow rate of the hot incinerator exhaust put through the heat plenum 78 can be regulated to less than 100%, via a valve 84 which can vent an unneeded portion of the cleaned, hot gases into the atmosphere. Automatic controls (not shown) can be used to effect this adjustment and produce the desired oven wall temperature.

As in the oven apparatus 10 of FIG. 1, a conveyor 16 is also shown in FIG. 2, for continuously moving food products through the oven chamber. Steam is introduced into the oven chamber 54 as indicated at 86. If desired for specific applications the oven system 50 could comprise a static, batch-process oven.

If the oven chamber 54 is operated at a moderate temperature such as 800° F. or less to fully cook food products, and those products contain renderable fats, oils, crumbs or other particles, the incinerator or combustion chamber 52 is needed to dispose of the resulting cooking by-product materials. They will not be incinerated in the oven chamber 54, since the wall temperatures are not high enough, and considerable smoke will be generated in the chamber and exhausted through the vents 56. The temperature of the oven exhaust in this case is relatively low, but this is increased somewhat by heat exchange with the plenum exhaust in the exchanger 64. The oven atmosphere gases are incinerated in the combustion chamber 52 at about 1400° to 1500° F. as explained above, and are then introduced into the plenum 78. At this point the gases have been cleaned sufficiently to be exhausted to atmosphere, and in the plenum they are mixed with combustion gases from the burner 80 and then exhausted through the stack 66, through the heat exchanger 64 and to the atmosphere. The hot gases may first be passed through a heat exchanger such as the exchanger 69 to produce steam from water, to be used at the steam injection port 86.

FIG. 4 shows another embodiment of the invention which employs the same principles of radiant wall cooking but which has the advantages of being able to brown and cook a food product in a single cycle, on a single conveyor path. The oven 100 shown in FIG. 4 again has a housing 102 with insulation 104, and oven chamber walls 106 and 108. As above, these are preferably cylindrical, circular-cylindrical, elliptical-cylindrical or other shapes wherein the radiant wall 106 or 108 preferably has continuity around its periphery. Gas burners are shown at 110 and 112, with steam being injected at 114. A conveyor 116 moves food products through the oven from left to right in the embodiment illustrated.

An important feature of the oven 100 of FIG. 4 is that it has essentially two stages of cooking while still being a continuous process, fed by the conveyor 116. Browning is accomplished in a first oven chamber 118, then full cooking occurs in an adjacent chamber 120, although the direction of the conveyor could be reversed to cook the product before the high temperature browning. However, it is normally advantageous with most commercial cooking, wherein the product is frozen or cold before entering the oven, to first brown the food product in the chamber 118. This effectively browns the surface without breaking down internal fats, oils and moisture. Then the slower, lower temperature full cooking takes place in the chamber 120, and the overall loss of these fats, oils and moisture is far less than if the product were first heated to, say, 120° F. internally in the cooking oven 120 and then subjected to the very high temperature radiant walls in the chamber 118 for the browning characteristics.

The oven 100 in FIG. 4 is configured to accomplish lower temperature cooking in the oven 120, e.g. about 500° to 750° F., which with meat, poultry or other fatty products will produce considerable smoke, drippings and particulate material. The two-stage oven 100 enables these rendered fats and smoke to be incinerated in the higher temperature chamber 118, via the radiant walls 106 which preferably are at about 1400° to 1500° F. This is accomplished by locating a vent 122 and vent vestibule 124 only at the end of the unit which is adjacent to the higher temperature chamber 118. Thus, the movement of gases is always to the left as seen in FIG. 4, and smoke and combustible gases generated in the lower temperature chamber 120 are drawn through the high temperature chamber 118, incinerated to effectively clean

them, and then are exhausted through the exhaust vent 122. This can eliminate the need for an external combustion chamber or incinerator 52 as shown in FIG. 2.

Although the oven chamber walls 106 and 108 could be one continuous wall (such as of stainless steel, as above) without division between heat plenum 126 and 128 and relying on a gradation of temperature down from left to right in the figure, these plenum preferably are separated into discrete areas as shown by a divider wall 130 in the drawing. This enables better control of the temperatures in each of the two oven chambers 188 and 120, i.e. within the incinerating range and within the full cooking range, respectively. Baffles or other heat sink devices (not shown) can be included in the plenum 126 and 128, connected to the outside of the radiant walls, to assist in the transfer of heat into the walls 106 and 108.

As noted above relative to the oven of FIG. 2, the lower temperature cooking oven chamber 120 in FIG. 4 has the capability of self-cleaning. After a period of use for cooking greasy food products, the temperature of the radiant wall 108 in the chamber 120 can be elevated to about 1000°, or whatever temperature is sufficient to clean all of the particular residues or tars, varnish or other rendered products which have adhered to the walls of the chamber. Also, the oven apparatus 100 can be used at a slightly tilted attitude, with the right end as seen in FIG. 4 elevated above the left end. This will induce rendered fats and oils to flow downward into the incinerating chamber 118. A divider wall frame or flange 132 shown in the drawing may have a slot or hole indicated by a dashed line 134 for this purpose. The divider wall flange or collar 132 can extend farther into the oven, closer to the conveyor 116 if desired for greater isolation between the two oven chambers 118 and 120.

Exhaust from the high temperature plenum 126 is shown at an exhaust stack 136. For the other chamber, the lower temperature plenum 122 is exhausted via a stack schematically indicated at 138. The volume of exhaust is relatively low from each plenum, since essentially only a volume equal to the air portion of the gas-air mixture entering the plenum 126 via the flame shown at 140, and the plenum 128 via the flame 142, need be exhausted. As described previously, the heat from the high-temperature exhaust can be used to heat the lower-temperature plenum 128 (arrangement not shown), by feeding the exhaust at 136 into the plenum 128; also, any excess heat exhausted from the oven at 100 or from the plenum exhaust 138 can be used to generate steam to be injected at the steam entrance 114.

Controls for the oven apparatus 100 are schematically indicated in FIG. 4. A control unit 144 is connected to a temperature sensor 146 on the wall of the lower temperature cooking oven, via a wire or thermocouple 148. This controls the burner 112 via a connection 150. Similarly, a sensor 152 is located on the exterior of the chamber wall 106 in the high temperature plenum, connected by a connection 154 (shown broken) to the control unit 144. The burner 110 is connected to the unit 144 via a line 156 (also shown broken).

The oven exhaust vent 122 is controlled by a withdrawal fan and/or damping (not shown). This is needed to "tune" the system such that the correct amount of gas flow is drawn to the left as seen in FIG. 4, through the incinerating oven area 118. It is important that this draw not be too great since, in a continuous flow conveyORIZED oven as indicated, the conveyor exit side will have an opening 158, and little or no air should be drawn in this opening, to prevent flaming inside the oven chambers. The withdrawal rate through the vent 122 is also balanced against the volume flow rate of

steam injected at 114, so that there is preferably a balanced situation at the conveyor exit opening 158 whereby the steam atmosphere holds back any air from coming into the oven at that end.

FIG. 5 schematically illustrates a further embodiment of the invention. The radiant wall oven 165 shown in FIG. 5 can be considered a modification of the unit 10 shown in FIG. 1. The radiant wall oven of FIG. 5 is useful for producing branding or grill marks on products such as hamburger patties, pork patties, sausages, chicken patties and parts, steaks, chops, fish, etc. A conveyor 166 for the oven returns through the oven itself, rather than returning outside as shown in FIGS. 1, 2 and 4. Thus, the metal conveyor 166 accumulates enough heat to be at a temperature appropriate for grill striping the food products. Such a temperature is generally in the range of about 600° to 800° F.; generally 600° to 700° is sufficient, depending on the product, its input temperature and dwell time on the conveyor.

The belt 166 comprises an open mesh or a series of metal rods, preferably stainless steel and preferably about 50% to 60% open. There will be some shadowing by the return portion 166a of the belt, which is positioned between the lower part of the radiant wall 168 and the upper, working flight 166b of the conveyor. However, if the belt is sufficiently open, the movement of the return portion 166a minimizes shadowing and prevents any specific effects of shadowing.

Since the radiant wall 168 of the oven is at a high temperature such as described above (1000° to 1500° F., preferably about 1450° F.), the belt 166 may attain too high a temperature, well over 1000°, and this would in most cases cause objectionable burning at the grill stripes. For this purpose, a temperature control apparatus 170 is included in a preferred embodiment. The apparatus 170, shown schematically, includes rollers 172 and 174 for conveying the belt through a cooling vessel or area 176. The cooling area 176 can include cool air directed over the belt, or more preferably, a water spray. The temperature and intensity of water spray (or air or other cooling fluid, not shown) can be controlled by a manual control 178. This can adjust the flow of a water spray or other cooling device, and it can be "tuned" by an operator so as to achieve the desired temperature for the grill striping desired, or it can include a belt temperature sensor and a thermostat (not shown), so that a specific target temperature for grill striping can be manually set.

The temperature range of the belt for grill striping is important in another sense, in that if the belt is too hot and also if it is too cool, it can stick to the product, damaging the surface of the product.

FIG. 6 is another schematic view showing a cooking system 180 according to the invention, comprising a combination of a radiant wall oven 182 and a microwave oven 184. The radiant wall oven 182 is constructed generally as in embodiments described above with a radiant wall 186, a heated plenum 188 behind the wall 186, which may be heated by a gas burner 190, plenum exhaust 192 and oven exhaust 194. Steam or other non-combustible gas is injected at 196. A conveyor 198 is shown with a return portion 198a outside the oven; however, if grill striping is desired on products, as discussed above, the metal belt 198 can be returned through the oven chamber itself, with appropriate temperature control as also explained above. The operating temperature and other parameters of the oven 182 are preferably as described above. The radiant wall oven 182

effects a browning of the food products, with full cooking achieved by the microwave oven 184. It should be understood that although the order of cooking/browning will ordinarily be browning first in the radiant wall oven 182, then full cooking in the microwave oven 184, these steps can be accomplished in the reverse order. In commercial or industrial cooking, it is usually important to conduct the browning first, to maintain the yield of the product. If cooking is accomplished first, then the product is already hot when entering the browner, and the product will often release too much volume of juices, materially reducing yield.

It is emphasized, however, that in some cases or applications the cook step can be performed first. For on-site cooking (such as in franchise food outlets), where yield is not so important, it may sometimes be desirable to perform the microwave cooking step first. In many cases where the food product has been frozen, it is important to do the browning step first in order to assure that the browning effect is limited to the outside of the product, with little penetration.

In the case of a microwave oven 184, a conventional metal conveyor belt cannot be used. Thus, FIG. 6 shows a separate conveyor 200 passing through the internal chamber 202 of the microwave oven. Such a conveyor is typically of plastic materials, as is known in the commercial microwave industry. In the usual case wherein browning is accomplished first, the metal conveyor 198 from the radiant wall oven 182 passes adjacent to the conveyor 200, at respective rollers 204 and 206. Food products are transferred between the belts 198 and 200, and conventional belt transfer apparatus may be needed for this purpose, such as rollers positioned between the two belts.

Microwave cooking has assumed an important position in commercial cooking and in the food service industry. In many applications microwave cooking can require one-third, one-fourth or less the space of conventional cooking such as hot air convection systems often used in commercial applications. For purposes of the present invention, it is estimated that the radiant wall oven 182 can effect the browning (and grill striping, if desired) of meat, chicken and other products in about thirty seconds. The microwave cooking is estimated to require up to an additional 30 seconds, depending on power, but it may be accomplished in far less time, even under ten seconds in some circumstances. It is therefore seen that full browning, with grill striping if desired, and cooking of a food product such as meat, poultry, fish, sausage, etc. can be accomplished in less than one minute, with the product still exhibiting very good aesthetic qualities and being cooked as desired. The space required by the combination cooking system 180 shown in FIG. 6 is far less, e.g. 75% less, than any conventional cooking/browning system (the browning oven 182 may be, for example, ten feet or less in length, and the microwave oven 184 may occupy an additional ten feet). Further, the microwave and radiant wall ovens cooperate in two very important ways, in that both processes exhaust little or no smoke or environmentally objectionable gases into the atmosphere, and both ovens require very little cleaning. Cleaning and sanitation can be reduced by 90% in labor and chemicals.

FIG. 7 shows a modified form of the oven system of FIG. 1. In this embodiment, an oven system 210 cooks food products 14 by a combination of radiant wall cooking and hot air (or other hot inert gas) impingement cooking. The oven 210 has, as in the earlier described embodiments, a hot gas plenum 22 just inside an insulated exterior wall 25, serving as a combustion plenum. Heat from this plenum 22

is ultimately delivered into an oven chamber 212 for cooking of the food products 14. However, the oven system of this embodiment has radiant walls 218 and 220 which do not directly radiate heat to the food product. Instead, these walls 218 and 220 heat air within one or more hot air plenums 221, 222, as well as heating radiant walls 223, 225 immediately above and below the oven chamber 212. The walls 218 and 220 serve as outer hot walls of the hot air (hot gas) plenums 221, 222 (the two plenums 221, 222 can comprise a single plenum). An external fan or blower 226 supplies high velocity gas, preferably air, into the hot air plenum 221 as shown. An external blower preferably is used to avoid the expense of a blower which will operate in a high temperature environment. The blower 226 delivers air into the plenum 221 at an appropriate flow rate and pressure to achieve a desired air velocity exiting a series of nozzles 227. These nozzles 227 cover a width which is appropriate for the size of the food products 14 being browned or cooked; they preferably are not arranged in a single row as might appear from the drawing.

Air velocities from the nozzles can be, for example, in the range of about 1,000 to 15,000 feet per minute, and the temperature of the high velocity air can be in the range of about 500° to 1200° F. Although the hot air plenums 221 are shown above and below the food products in the oven chamber, they can be all around if desired, so as to impinge hot air or other gas against the products from all directions. In a preferred embodiment, the velocity of the hot air is controllable, via the setting of the blower 226. The size of the hot air plenums 221 and 222 is important relative to the air velocity and number and size of nozzles delivering hot air, since the air needs a sufficient dwell time in the plenums in order to achieve the desired temperature for assisting in the browning or cooking of the food products. Generally the higher the flow rate of air through the nozzles (for a given configuration), the lower will be the temperature of the air delivered against the products.

As in the previous embodiments, steam or other non-combustible gas is injected into the oven chamber 212 via a steam entry port 40. Even though air preferably is used as the hot medium for impingement against the food products, adding oxygen into the oven chamber, the flaming of rendered products of cooking can still be avoided through the injection of sufficient steam into the oven. This is generally at a higher flow rate than required in the earlier-described embodiments.

As an alternative to air as the hot impingement medium, steam can be used, which can lower or eliminate the need for steam injection at the steam port 40.

The combination of radiant wall heating of the food products via the walls 223, 225 and the hot air impingement on the food products enhances the browning or cooking rate in the oven chamber as compared to radiant wall cooking alone. In prior hot air impingement ovens (such as that disclosed in U.S. Pat. No. 4,737,373), which cooked products at about 600° to 700° F., there was generally a problem of oven cleaning. At these cooking temperatures, ovens of this type became fouled with greases and other products rendered during cooking, and the ovens were usually cleaned using chemicals. The oven of this invention, on the other hand, if used for full cooking of products at 600° or so, can be raised to 900° to 1000° F. or higher for self-cleaning. The oven 210 comprises a single oven that can be used for high-temperature browning or, at lower temperatures, for full cooking.

In the claims the term "radiant wall" used with reference to the oven of FIG. 7 or the oven of FIG. 8, refers to the walls 223, 225.

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FIG. 8 shows a radiant wall/air impingement oven system 240 which is an alternative to what is shown in FIG. 7. In this modified system the air for air impingement via the plenums 221 and 222 is heated by the normal exhaust of gases from the combustion plenum 22 of the radiant wall oven, via the exhaust conduit 24. As indicated schematically in FIG. 8, the exhaust gases from the combustion plenum 22 are directed through a heat exchanger 242 and then exhausted, which can be via a fan or blower 244. An air supply fan or blower 246 pushes air through the heat exchanger 242, so that it is relatively hot via this preheating when reaching the hot air plenums 221, 222. This keeps the products of combustion (from the plenum 22) out of the oven chamber 212, by avoidance of contact between the exhaust gases and the clean air for hot air impingement. Again, the clean air fan or blower 246 is preferably located on the "cold" side of the heat exchanger 242, so that a high temperature-tolerant blower is not needed. Also, it should be understood that the heat exchange/steam producing apparatus shown in FIG. 2 can still be employed in the system of FIG. 8 if desired, although this will provide less exhaust heat available for heat exchange with the impingement air.

The oven systems of FIGS. 7 and 8 act to increase the heat transfer rate to the food products as compared to simple radiant wall, infrared cooking described above, in the same reduced oxygen atmosphere. The addition of direct hot air impingement (or steam impingement) on the food products increases efficiency and browning or cooking rate.

The systems of FIG. 7 and FIG. 8 can also be used in conjunction with branding rods 45 described relative to FIG. 1; in a compound browning/cooking system as in FIG. 4; and as a browning unit, in tandem with a microwave oven as in FIG. 6. Further, as noted above, although the combined radiant wall and air impingement oven is ideal for browning of food products separately from cooking of the products, the ovens can also be set to an appropriate lower temperature (e.g., about 300° to 800° F.) for full cooking of food products, with the rendered materials dealt with either by high-temperature oven cleaning or by a system such as shown in FIG. 2.

As mentioned above, the radiant wall ovens, although preferably utilizing liquid or gas fuels, can instead incorporate a thin ceramic shell as the wall, with encased high-temperature resistance elements. The wall is backed by insulation, but without the need for a heat plenum as in the fuel-burning embodiments. Such an electrical resistance oven is similar to what is shown in FIGS. 1 and 3-6, but does not include the heating or combustion plenum (e.g. 22 in FIG. 1) with no need for any plenum exhaust. The inclusion of electrical heating elements in a ceramic wall is known for other purposes; particularly in electrical drying equipment with lower temperature heating elements embedded in ceramic.

The above described preferred embodiments are intended to illustrate the principles of the invention but without limiting its scope. Other embodiments and variations to these preferred embodiments will be apparent to those skilled in the art and may be made without departing from the essence and scope of the invention as defined in the claims.

We claim:

1. A method for cooking a food product, comprising:

placing the food product in an oven chamber having heated, radiant walls maintained at a temperature of at least about 1200° F., with the food product spaced from the walls,

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delivering a heated gas through nozzles into the oven chamber and impinging the heated gas against the food product, and thereby simultaneously subjecting a surface of the food product to both radiant heat and hot gas impingement,

retaining the food product in the oven chamber and subjected to the heat from the radiant walls and from the heated gas impingement for a dwell time sufficient to brown the surfaces of the food product, but not sufficient to burn the exterior surfaces, and

introducing and maintaining an oxygen-deficient atmosphere in the oven chamber, low enough in oxygen that the food product does not flame while in the oven chamber.

2. The method of claim 1, wherein the step of retaining the food product in the oven chamber comprises conveying food products through the oven chamber continuously on a conveyor, at a rate selected to provide a desired dwell time in the oven chamber.

3. The method of claim 2, including conveying the food products through a two-stage oven chamber, one stage being at a temperature sufficiently high to incinerate all rendered materials from the food product while browning the surfaces of the food product, with a dwell time insufficient to fully cook the food product, and the other stage being at a lower temperature at which the food product is fully cooked, and including constantly moving the oven atmosphere in a direction from the lower temperature chamber to the higher temperature chamber and exhausting the atmosphere from the higher temperature chamber, so that rendered materials entering the oven atmosphere in the lower temperature chamber are incinerated in the higher temperature chamber.

4. The method of claim 1, further including contacting top surfaces of the food products with a plurality of hot branding rods in the oven as the food products are conveyed through the oven to thereby move the food products against the branding rods and thus to form grill or brand marks on the food products.

5. The method of claim 1, wherein the food product is thick enough that its interior is not fully cooked by the radiant wall oven, and including the further step of cooking the food product separately at a lower temperature.

6. The method of claim 1, wherein the radiant walls of the oven are maintained at a temperature between about 1400° F. and 1500° F.

7. The method of claim 1, wherein the temperature of the radiant walls is about 1400° to 1500° F., and wherein the food product is sufficiently thin that it is fully cooked by its dwell time in the radiant wall oven.

8. The method of claim 1, wherein the temperature of the radiant walls is about 1400° to 1500° F., and including incinerating essentially all rendered and dropped materials from the food product in the oxygen-deficient atmosphere and exhausting gases from the oven chamber to the outside atmosphere.

9. The method of claim 1, wherein the radiant walls of the oven and said heated gas are maintained at temperatures sufficient, within said dwell time, to brown the surfaces of the food product without fully cooking the food product, and including the further step of cooking the food separately in a microwave oven.

10. The method of claim 9, wherein the step of retaining the food product in the oven chamber comprises conveying food products through the oven chamber continuously on a conveyor, at a rate selected to provide said dwell time sufficient to brown the surfaces of the food product.

11. The method of claim 10, wherein the radiant walls of the oven chamber are maintained at a temperature between about 1400° F. and 1500° F.

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12. The method of claim 1, wherein the step of delivering a heated gas comprises maintaining a hot gas plenum immediately behind the heated, radiant walls, said nozzles being in the radiant walls, and directing gas into the hot gas plenum and then through the nozzles.

13. The method of claim 12, further including providing an outer hot wall at an outside boundary of the hot gas plenum, and heating the outer hot wall by combustion in a combustion plenum just outside said outer hot wall.

14. The method of claim 1, wherein the step of delivering a heated gas comprises delivering heated air.

15. A method for cooking a food product by radiant energy, and for producing grill stripes or brand marks on the food product comprising:

moving the food product on a conveyor through a cooking oven chamber which includes heated walls maintained at least at about 1200° F., giving off radiant heat toward the food product,

contacting the top surface of the food product with a plurality of hot stationary branding rods in the oven as the food product is conveyed through the oven to thereby form brand marks on the food product,

introducing and maintaining an oxygen-deficient atmosphere in the oven, low enough in oxygen that the food product does not flame while cooking in the oven chamber, and

constantly withdrawing at least a portion of the oven atmosphere from the oven chamber.

16. The method of claim 15, including heating the branding rods with radiant heat from the heated walls.

17. An oven for cooking food products using radiant wall heat combined with hot gas impingement against the food products, comprising:

a housing defining an oven chamber with walls, means for heating said walls from outside the oven chamber to a temperature of at least about 1200° F., to direct radiant heat onto a surface of a food product in the oven chamber,

means for delivering hot gas from nozzles directly against the food products to heat the surface also receiving radiant heat from said walls,

flame retardant means for maintaining an oxygen-starved atmosphere in the oven chamber, to prevent flaming of food products or materials rendered from the food products when cooked in the oven chamber, and

exhaust means for withdrawing gases from the oven atmosphere during cooking of food products.

18. The oven of claim 17, further including a hot gas plenum immediately behind at least one said wall of the oven, said one wall having the nozzles leading into the oven chamber, the hot gas plenum having an outer hot wall, and including a combustion plenum immediately outside said outer hot wall, and fuel burner means in the combustion plenum for burning fuel in the combustion plenum.

19. The oven of claim 18, further including heat exchange means for receiving exhaust from the combustion plenum and salvaging heat from the exhaust by heating gas to be introduced into the hot gas plenum.

20. The oven of claim 17, wherein the flame retardant means comprises means for introducing steam into the oven atmosphere.

21. The oven of claim 17, wherein the means for delivering hot gas comprises means for delivering hot air.

22. The oven of claim 17, further including food product conveyor means for continuously moving food products through the oven chamber.

23. The oven of claim 22, wherein the radiant walls of the oven are at a temperature of about 1400° F. to 1500° F., sufficiently high to brown the surfaces of the food products and to incinerate rendered materials injected into the oven atmosphere from the food products, said conveyor means operating at a speed sufficient to avoid full cooking of the food products while allowing browning of the food products.

24. The oven of claim 23, further including microwave cooking means adjacent to said oven chamber, with means for moving the food products through the microwave cooking means to fully cook the food products.

25. The oven of claim 24, wherein the microwave cooking means is positioned to fully cook the food products after they have been browned in said oven chamber.

26. The oven of claim 22, wherein the oven chamber comprises a pair of adjacent, successive chambers along a path of the conveyor means, including a browning oven chamber having walls and hot gas at said nozzles of sufficiently high temperature to incinerate rendered materials injected into the oven atmosphere from the food products, and a cooking oven chamber at a lower temperature, insufficient to incinerate rendered materials, and wherein the relative lengths of the browning chamber and the cooking chamber are such that, at the speed of movement of the conveyor means, the food products are only surface-browned in the browning oven chamber and are fully cooked in the cooking oven chamber.

27. The oven of claim 26, further including means for continually moving the oven atmosphere in a direction from the cooking oven chamber toward the browning oven chamber and to the exhaust means, whereby rendered materials entering the atmosphere in the cooking oven chamber are incinerated in the browning oven chamber before being exhausted.

28. The oven of claim 27, wherein the browning oven chamber is positioned before the cooking oven chamber along the path of the conveyor means.

29. A cooking system for browning and cooking food products, comprising:

a browning oven for browning the surfaces of food products, including

a housing defining an oven chamber with radiant walls, the radiant walls having heating means for heating the walls to at least about 1200° F. to impart radiant energy into the oven chamber and against surfaces of the food products,

hot gas impingement means within the housing for delivering hot gas against surfaces of the food products which also simultaneously receive radiant energy from the radiant walls,

flame retardant means for maintaining an oxygen-starved atmosphere in the oven chamber, to prevent flaming of food products or materials rendered from the food products when heated in the oven chamber, and

exhaust means for withdrawing gases from the oven atmosphere during browning of food products;

a cooking oven, including microwave cooking means for fully cooking the food products by microwave radiation; and

means for moving food products through both ovens and for transferring food products between ovens so that the food products are fully cooked and surface-browned.

30. The cooking system of claim 29, wherein the browning oven is positioned in advance of the cooking oven so that food products are first surface-browned, then cooked.

31. The cooking system of claim 29, wherein the walls of the oven chamber are maintained at a temperature of about 1400° to 1500° F., sufficiently high in combination with the hot gas impingement means to brown the surfaces of the food products and to incinerate rendered materials injected

into the oven atmosphere from the food products, for a preselected dwell time of the food products in the browning oven.

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CRPF07807

PTO-003598

IN THE U.S. PATENT AND TRADEMARK OFFICE

APPLICATION

Title: **HIGH TEMP. TURE METHOD FOR BROWNING
PRECOOKED, WHOLE MUSCLE MEAT
PRODUCTS**

Clie.) **C945**

Case No **43882 PCT**

Atty/Sec **ED/edb**

Priority Claimed? ☒ YES

Assignment Enclosed (List Assignee)

Date Mailed **Jan. 24, 2002**

Express Mail No.
EL483388476US

Check(s) **\$1,552.00**

Checked by: **WMD**

	Patent	Mark
Transmittal Letter(s)	1 + 1	
Application (No. of Pages)	1 + 20	
Declaration & Pwr of Atty	1 executed	Included
Informal/Formal Drawings	none	
3 Specimens/Photos/Facsimiles	N/A	
Small Entity Declaration	n/a	N/A
Info Disc Stmt/PTO-1449		N/A
Petition Extension of Time		N/A
PCT	yes	
OTHER		

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SERIAL NUMBER/FILING DATE

EL483388476US

Applicant Use Only

PATENT: ☒ ORD ☐ PRO ☐ PCT ☐ ORP ☐ CPP ☐ DIV ☐ CON ☐ CIP ☐ REI ☐ REX OF ☐ DOCKET

MARK: ☐ TM ☐ SM ☐ TM/SM ☐ COLL ☐ CERT; ☐ ITU ☐ 44d ☐ 44e ☐ DIV

DOCKET: Y/N Standard ☒ FOR REV ☒ FOR DEADLINE Parent Case ☒ FOR REV/DEADLINE

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CRPF07808

PTO-003599

TRANSMITTAL LET. R TO THE
UNITED STATES RECEIVING OFFICE

International Application No.	Not yet assigned
Attorney Docket No	42892P/C945

I. Certification under 37 CFR 1.10 (if applicable)

EL483388476us
Express Mail mailing number

24 January 2002 (24.01.02)
Date of Deposit

I hereby certify that the application/correspondence attached hereto is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Assistant Commissioner for Patents, Washington, D.C. 20231.


Signature of person mailing correspondence

Elise D. Bray
Typed or printed name of person mailing correspondence

II. ☒ New International Application

TITLE	HIGH TEMPERATURE METHOD FOR BROWNING PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS
-------	--

Earliest priority date (Day/Month/Year)
26 January 2001 (26.01.01)

SCREENING DISCLOSURE INFORMATION: In order to assist in screening the accompanying international application for purposes of determining whether a license for foreign transmittal should and could be granted and for other purposes, the following information is supplied. (Note: check as many boxes as apply):

- A. ☐ The invention disclosed was not made in the United States.
- B. ☐ There is no prior U.S. application relating to this invention.
- C. ☒ The following prior U.S. application(s) contain subject matter which is related to the invention disclosed in the attached international application. (NOTE: priority to these applications may or may not be claimed on form PCT/RO/101 (Request) and this listing does not constitute a claim for priority).

application no.	09/772,100	filed on	26 January 2001 (26.01.01)
application no.		filed on	

- D. ☒ The present international application ☒ is identical ☐ contains less subject matter than that found in the prior U.S. application(s) identified in paragraph C.
- E. ☐ The present international application ☐ contains additional subject matter not found in the prior U.S. application(s) identified in paragraph C. above. The additional subject matter is found on pages _____ and ☐ DOES NOT ALTER ☐ MIGHT BE CONSIDERED TO ALTER the general nature of the invention in a manner which would require the U.S. application to have been made available for inspection by the appropriate defense agencies under 35 U.S.C. 181 and 37 CFR 5.1. See 37 CFR 5.15

III. ☐ A Response to an Invitation from the RO/US. The following document(s) is (are) enclosed:

- A. ☐ A Request for An Extension of Time to File a Response
- B. ☐ A Power of Attorney (General or Regular)
- C. ☐ Replacement pages:

pages		of the request (PCT/RO/101)	pages		of the figures
pages		of the description	pages		of the abstract
pages		of the claims			

- D. ☐ Submission of Priority Documents

Priority document	/	Priority document
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- E. ☐ Fees as specified on attached Fee Calculation sheet form PCT/RO/101 annex

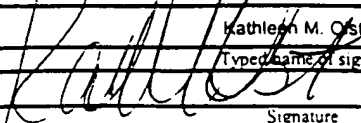
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CRPF07809

IV. ☐ A Request for Rectification under PCT 91 ☐ A Petition ☐ A Sequence Listing Diskette

- V. ☒ Other (please specify): Fee calculation sheet, Power of Attorney by Assignee, unexecuted Power of Attorney by Inventor and a check for \$1,552.00.

The person signing this form is the

<input type="checkbox"/> Applicant		
<input checked="" type="checkbox"/> Attorney/Agent (Reg. No.) 42,052		Kathleen M. O'Ster Typed name of signer
<input type="checkbox"/> Common Representative		Signature

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) 42892P/945

Box No. I TITLE OF INVENTION

HIGH TEMPERATURE METHOD FOR BROWNING PRECOOKED WHOLE MUSCLE MEAT PRODUCTS

Box No. II APPLICANT

☐ This person is also inventor

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

SWIFT-ECKRICH, INC.
2001 Butterfield Road
Downers Grove, Illinois 60515-1049
United States of America

Telephone No.

Facsimile No.

Teleprinter No.

Applicant's registration No. with the Office

State (that is, country) of nationality:
US

State (that is, country) of residence:
US

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

SINGH, Prem S.
148 Spring Avenue
Glenellyn, Illinois 60137
United States of America

This person is:

☐ applicant only☒ applicant and inventor☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:
US

State (that is, country) of residence:
US

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent ☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

OLSTER, Kathleen M.
CHRISTIE, PARKER & HALE, LLP
P.O. Box 7068
Pasadena, California 91109-7068
United States of America

Telephone No.
(626) 795-9900

Facsimile No.
(626) 577-8800

Teleprinter No.

Agent's registration No. with the Office
42.052

CONFIDENTIAL

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No.V DESIGNATION OF STATES

Mark the applicable check-boxes below. at least one must be marked

The following designations are hereby made under Rule 4.9(a):

Regional Patent

- ☒ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH & LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> AG Antigua and Barbuda | <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> MZ Mozambique |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> RO Romania |
| | <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> JP Japan | |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> KP Democratic People's Republic | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> BZ Belize | of Korea | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> KR Republic of Korea | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> CH & LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> KZ Kazakhstan | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> LC Saint Lucia | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> CO Colombia | <input checked="" type="checkbox"/> LK Sri Lanka | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> CR Costa Rica | <input checked="" type="checkbox"/> LR Liberia | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> LS Lesotho | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> LT Lithuania | |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> LU Luxembourg | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> LV Latvia | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> MA Morocco | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> DZ Algeria | <input checked="" type="checkbox"/> MD Republic of Moldova | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> EE Estonia | | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> MG Madagascar | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> GB United Kingdom | Macedonia | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> MN Mongolia | <input checked="" type="checkbox"/> ZW Zimbabwe |

Check-boxes below reserved for designating States which have become party to the PCT after issuance of this sheet:

- | | | |
|--|--|--|
| <input checked="" type="checkbox"/> GQ Equatorial Guinea | <input checked="" type="checkbox"/> PH Philippines | <input checked="" type="checkbox"/> EC Ecuador |
| <input checked="" type="checkbox"/> OM Oman | <input checked="" type="checkbox"/> ZM Zambia | <input checked="" type="checkbox"/> TN Tunisia |

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1) 26 January 2001 (26.01.01)	09/772,100	US		
item (2)				
item (3)				
item (4)				
item (5)				

☐ Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office) identified above as:

☐ all items
 ☒ item (1)
 ☐ item (2)
 ☐ item (3)
 ☐ item (4)
 ☐ item (5)
 ☐ other, see Supplemental Box

* Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)):

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA/ US.....

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year) Number Country (or regional Office)

Box No. VIII DECLARATIONS

The following declarations are contained in Boxes Nos. VIII (i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):

Number of
declarations

- | | | |
|---|--|---|
| <input type="checkbox"/> Box No. VIII (i) | Declaration as to the identity of the inventor | : |
| <input type="checkbox"/> Box No. VIII (ii) | Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent | : |
| <input type="checkbox"/> Box No. VIII (iii) | Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application | : |
| <input type="checkbox"/> Box No. VIII (iv) | Declaration of inventorship (only for the purposes of the designation of the United States of America) | : |
| <input type="checkbox"/> Box No. VIII (v) | Declaration as to non-prejudicial disclosures or exceptions to lack of novelty | : |

Box No. IX CHECK LIST: LANGUAGE OF FILING

This international application contains:		This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item):	Number of items
(a) the following number of sheets in paper form:		1. <input checked="" type="checkbox"/> fee calculation sheet	:
request (including declaration sheets)	4	2. <input type="checkbox"/> original separate power of attorney	:
description (excluding sequence listing part)	11	3. <input type="checkbox"/> original general power of attorney	:
claims	4	4. <input checked="" type="checkbox"/> copy of general power of attorney; reference number, if any:	:
abstract	1	5. <input type="checkbox"/> statement explaining lack of signature	:
drawings	0	6. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s):	:
Sub-total number of sheets	20	7. <input type="checkbox"/> translation of international application into (language):	:
sequence listing part of description (actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (b) below)	:	8. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material	:
Total number of sheets	20	9. <input type="checkbox"/> sequence listing in computer readable form (indicate also type and number of carriers (diskette, CD-ROM, CD-R or other))	:
(b) sequence listing part of description filed in computer readable form		(i) <input type="checkbox"/> copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application)	:
(i) <input type="checkbox"/> only (under Section 801 (a)(i))		(ii) <input type="checkbox"/> (only where check-box (b)(i) or (b)(ii) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter	:
(ii) <input type="checkbox"/> in addition to being filed in paper form (under Section 801 (a)(ii))		(iii) <input type="checkbox"/> together with relevant statement as to the identity of the copy or copies with the sequence listing part mentioned in left column	:
Type and number of carriers (diskette, CD-ROM, CD-R or other) on which the sequence listing part is contained (additional copies to be indicated under item 9(ii), in right column):		10. <input checked="" type="checkbox"/> other (specify): unexecuted Power of Attorney for	:
Figure of the drawings which should accompany the abstract:		Language of filing of the international application: English	

Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).


 Kathleen M. Olster

For receiving Office use only		2. Drawings: <input type="checkbox"/> received <input type="checkbox"/> not received
1. Date of actual receipt of the purported international application:		
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA/	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid	

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Date of receipt of the record copy by the International Bureau:

Form PCT/RO/101 (last sheet) (March 2001)
 LegalStar 2001, Form PCTREQ

See Notes to the request form

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CRPF07813

PTO-003604

PCT**FEE CALCULATION SHEET****Annex to the Request**

For receiving Office use only

International Application No.

Applicant's or agent's
file reference

42892P/C945

Date stamp of the receiving Office

Applicant
Swift-Eckrich, Inc. et al.**CALCULATION OF PRESCRIBED FEES**1. TRANSMITTAL FEE 240.00 **T**2. SEARCH FEE 450.00 **S**International search to be carried out by US

(If two or more International Searching Authorities are competent to carry out the international search, indicate the name of the Authority which is chosen to carry out the international search.)

3. INTERNATIONAL FEE

Basic FeeWhere item (b) of Box No. IX applies, enter Sub-total number of sheets } 20
Where item (b) of Box No. IX does not apply, enter Total number of sheets }**b1** first 30 sheets 407.00 **b1****b2** 0 x = 0.00 **b2**
number of sheets fee per sheet**b3** additional component (only if sequence listing part of description
is filed in computer readable form under Section 801(a)(i), or both
in that form and on paper, under Section 801(a)(ii)):400 x = **b3**
fee per sheetAdd amounts entered at b1, b2 and b3 and enter total at B 407.00 **B****Designation Fees**The international application contains all designations.5 x 88.00 = 440.00 **D**number of designation fees amount of designation fee
payable (maximum 6)Add amounts entered at B and D and enter total at I 847.00 **I**(Applicants from certain States are entitled to a reduction of 75% of the
international fee. Where the applicant is (or all applicants are) so entitled, the4. FEE FOR PRIORITY DOCUMENT (if applicable) 15.00 **P**

5. TOTAL FEES PAYABLE 1,552.00

Add amounts entered at T, S, I and P, and enter total in the TOTAL box

TOTAL☐ The designation fees are not paid at this time.**MODE OF PAYMENT**☐ authorization to charge☐ postal money order☐ cash☐ coupons

CRPF07814

☒ cheque☐ bank draft☐ revenue stamps☐ other (specify):**AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT ACCOUNT**

(This mode of payment may not be available at all receiving Offices)

☐ Authorization to charge the total fees indicated above.☒ (This check-box may be marked only if the conditions for deposit accounts of
the receiving Office so permit) Authorization to charge any deficiency or
credit any overpayment in the total fees indicated above.☐ Authorization to charge the fee for priority document.Receiving Office: RO/ USDeposit Account No.: 03-1728Date: 24 January 2002 (24.01.02)Name: Kathleen M. OisterSignature: [Signature]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Prem S. Singh

Examiner: Not Yet Assigned

Serial No.: 09/772,100

Art Unit: 1761

Filed: January 26, 2001

For: HIGH TEMPERATURE METHOD FOR
BROWNING PRECOOKED, WHOLE
MUSCLE MEAT PRODUCTS

Atty. Dkt. No.: 42892/KMO/C945

POWER OF ATTORNEY BY ASSIGNEE
TO EXCLUSION OF INVENTOR

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

I, the undersigned, am an officer of Swift-Eckrich, Inc., the assignee of the entire right, title and interest in the application for United States Letters Patent entitled HIGH TEMPERATURE METHOD FOR BROWNING PRECOOKED, WHOLE MUSCLE MEAT PRODUCTS and filed January 26, 2001, as Application Serial No. 09/772,100, and am authorized to sign on its behalf.

The Assignment of this application to Swift-Eckrich, Inc. was submitted for recordation on July 30, 2001, and a copy is being submitted herewith.

I have reviewed the foregoing document and hereby certify that, to the best of my knowledge and belief, title to the subject matter of this patent is in Swift-Eckrich, Inc.

I hereby appoint the following attorneys and agents of the law firm CHRISTIE, PARKER & HALE, LLP to prosecute this application and any international application under the Patent Cooperation Treaty based on it and to transact all business in the U.S. Patent and Trademark Office

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connected with either of them, said appointment to be to the exclusion of the inventors and their attorneys in accordance with Rule 32 of the Patent Office Rules of Practice:

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D. Bruce Prout	(20,958)	Craig A. Gelfound	(41,032)	John W. Peck	(44,284)
Hayden A. Carney	(22,653)	Syed A. Hasan	(41,057)	Stephen D. Burbach	(40,285)
Richard J. Ward, Jr.	(24,187)	Kathleen M. Olster	(42,052)	David B. Sandelands, Jr.	(46,023)
Russell R. Palmer, Jr.	(22,994)	Daniel M. Cavanagh	(41,661)	Heidi L. Eisenhut	(46,812)
LeRoy T. Rahn	(20,356)	Molly A. Holman	(40,022)	Nicholas J. Pauley	(44,999)
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Walter G. Maxwell	(25,355)	Patrick Y. Ikehara	(42,681)	Paul Heynssens	(47,648)
William P. Christie	(29,371)	Mark Garscia	(31,953)	Peter A. Nichols	(47,822)
David A. Dillard	(30,831)	Gary J. Nelson	(44,257)	David J. Steele	(47,317)
Thomas J. Daly	(32,213)	Raymond R. Tabandeh	(43,945)	Laurence H. Pretty	(25,312)
Vincent G. Gioia	(19,959)	Cynthia A. Bonner	(44,548)	Robert A. Schroeder	(25,373)
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John D. Carpenter	(34,133)	Marc A. Karish	(44,816)	Michael J. MacDermott	(29,946)
David A. Plumley	(37,208)	John F. O'Rourke	(38,985)	Anne Wang	(36,045)
Wesley W. Monroe	(39,778)	Richard J. Paciulan	(28,248)	Richard A. Clegg	(33,485)
Gregory S. Lampert	(35,581)	Josephine E. Chang	(46,083)	Natu J. Patel	(39,559)
Grant T. Langton	(39,739)	Frank L. Cire	(42,419)	Tom H. Dao	(44,641)
Constantine Marantidis	(39,759)	Harold E. Wurst	(22,183)		

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DIRECT TELEPHONE CALLS TO: Kathleen M. Olster, Esq., 626/795-9900
 SEND CORRESPONDENCE TO: CHRISTIE, PARKER & HALE, LLP
 P.O. Box 7068, Pasadena, CA 91109-7068

Swift-Eckrich, Inc.

Date: _____

By: _____

Name: Dennis C. Gott, Esq.

Title: Vice-President

General Counsel and Secretary

KMO:nml

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